

Delaware, Lackawanna & Western Railroad
Scranton
Lackawanna County
Pennsylvania

HAER No. PA-132

HAER

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PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

REDUCED COPIES OF MEASURED DRAWINGS

Historic American Engineering Record
National Park Service
Department of the Interior
Washington, D.C. 20013-7127

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HISTORIC AMERICAN ENGINEERING RECORD

Delaware, Lackawanna & Western Railroad: Scranton Yards
HAER NO. PA-132

LOCATION: Lackawanna Avenue, Cedar Avenue, River Street
and Seventh Avenue, Scranton, Lackawanna
County, Pennsylvania

UTM: 18/44388/458498
QUAD: Scranton

PRESENT OWNER: United States Department of the Interior, National
Park Service

PRESENT USE: Portions in use as National Historic Site; some
railroad use.

SIGNIFICANCE: The Scranton yards of the D,L & W Railroad are
representative of twentieth-century steam-era
facilities. Many structures remain from the
administration of D,L & W President William H.
Truesdale (1899-1925) and reflect his ambitious
modernization program of that period.

HISTORIAN: Amy Slaton

PROJECT HISTORIANS: Amy Slaton and Kathryn Steen
Delaware, Lackawanna & Western Railroad: Scranton
Yards Recording Project, 1989

PREFACE

This HAER project documents ten structures at the Delaware, Lackawanna & Western Railroad Yards of Scranton, Pennsylvania. Built between 1906 and 1926, these structures include locomotive maintenance facilities, bridges, and switching and signal systems. The priorities and technologies favored by the D,L & W management, particularly those of its president from 1899 to 1925, William H. Truesdale, reflected contemporary conditions in eastern American railroading. Some concerns were specific to the handful of anthracite coal roads, all of which sought strategies to survive in a time of lower coal shipping rates and the rapid development of competing fuels. Other concerns were shared by the railroad industry as a whole, among them increasing government regulation and the rise of air and vehicular transport. These influences on the railroads were interrelated, and their form and history can be traced in the operation of the D,L & W at its major mainline yards at Scranton.

In common with other railroads in northeastern Pennsylvania, the origins of the D,L & W lie in its proximity to valuable anthracite deposits and to the markets of the eastern seaboard. However, these geographical factors do not adequately explain the early success of the railroads; similarly, as Robert Carson has suggested, new fuel technologies and government regulation do not wholly account for their decline.¹ Instead the history of each railroad company was individually determined by the policies of its

management.

Truesdale's modernization program as president of the D,L & W was especially aggressive as he intended to prepare the railroad for a great increase in traffic. He began with the abrupt purge of much of the D,L & W's upper management in the first year of the new century, and then instituted a two-pronged approach that included an emphasis on efficiency in all aspects of the railroad's operation and on major physical improvements over the entire line to both trackage and structures.² The pursuit of efficiency called for careful and rigid organization of traffic on all levels: the movements of trains, freight and workers throughout the line were studied and revised. Truesdale pursued the physical improvement of the road by hiring prominent engineers. His first appointee to the position of chief engineer was William K. McFarlin. Lincoln Bush followed McFarlin in 1903, and Bush's assistant, George Ray, became chief engineer when Bush left the company to go into private consulting in 1909. These engineers instituted the extensive use of reinforced concrete for bridges and buildings on the D,L & W and, under Truesdale's direction, standardized many building types. Both Bush and Ray, working with D,L & W architect Frank Nies, contributed extensively to the form of the Scranton yards. Though it is at times unclear which design decisions were made by upper management, which by D,L & W engineers and which by the railroad's architects, technical and aesthetic consistencies can be found throughout the Scranton yards and across the entire D,L & W system. Individual structures and the

overarching strategies that shaped them are discussed at length in the reports that accompany this introduction, which is a brief history of the D,L & W's operation in and around Scranton.

EARLY HISTORY OF THE D,L & W

The D,L & W began in Scranton (then called Slocum's Hollow) in the middle of the nineteenth century. In 1837 George and Selden Scranton, iron manufacturers from New Jersey, went into partnership with Sanford Grant to purchase an iron furnace in Slocum's Hollow, an area which was said to have large deposits of iron ore, anthracite and limestone, all necessary for producing iron. However, because the ore turned out to be of inferior quality and the limestone entirely absent, the business venture had some difficulty at first. Fortunately, in 1847, the Scrantons learned that the New York & Erie railroad, then building in lower New York State, urgently needed iron T-rails, at that time made primarily in England. The Scrantons' furnaces began production of the first U.S. T-rails in 1847, and the brothers' decision to create their own railroad followed shortly thereafter; a local railroad would speed up and cheapen delivery of the T-rails to the New York and Erie railhead and, more importantly, would encourage the development of a coal company to mine and distribute local anthracite both as a domestic and industrial fuel. The Scrantons mined the Lackawanna Valley of the Appalachian Mountains which, with the Susquehanna River Valley, constituted a 484-square-mile

anthracite field that had first been mined by the Delaware and Hudson Canal Company in the 1830s. The already prosperous towns of nearby New York State presented an ideal market for anthracite, and in 1847 the Scrantons, with several co-investors, began the construction of their railroad with the purchase of the charter for the Liggett's Gap Railroad.³

As originally chartered, the Liggett's Gap Railroad was to have run north from the Lackawanna Valley. Under the Scrantons' ownership, building was begun and the railroad was renamed the Lackawanna & Western Railroad. A southern branch was developed from the Delaware and Cobb's Gap Railroad, and by 1853, the entire line was renamed the Delaware, Lackawanna & Western Railroad, and opened for business between Port Jervis, New York, to the east of Scranton (so named in 1849) and Great Bend, Pennsylvania, to the north. From this point, the Scranton's coal and iron industries were consistently expanded, and the railroad's connection to tidewater and interior markets actively pursued. After the nationwide panic of 1857, during which the D,L & W, without a reserve of working capital, went bankrupt, a strategy of reinvesting a portion of all earnings into the road was inaugurated. At this time, the first of the many powerful outside bankers to control the D,L & W's finances, Moses Taylor, also came on the scene.⁴

The D,L & W profited during and after the Civil War, and by 1863 its aggressive programs included auctioning its surplus coal in New York City, a move which has been said to have begun "the era of keen competition between the several anthracite producers which

was not to end until 1900."⁵ The intention of the D,L & W to shift from serving as a short, specialized coal railroad to a lesser, but profitable, trunk line, was fully revealed by the D,L & W's 1868 annexation of the Morris & Essex Railroad. This line gave access through New Jersey to New York Harbor, and construction toward the Great Lakes in that same decade confirmed the D,L & W's transformation from a local to a through line.⁶ Moreover, in March 1876, under the direction of D,L & W president Samuel Sloan, the railroad's track gauge was universally changed from 6 feet to the increasingly common 4½ feet. This huge undertaking, accomplished in less than 48 hours, brought the D,L & W into an even more competitive position among long-distance carriers.⁷

SYSTEM BUILDING

In the last quarter of the nineteenth century there were roughly eight anthracite railroads operating in the northeast, and rate wars were constantly undermining the profits of these companies. The nation's major railroad bankers, Cornelius "Commodore" Vanderbilt and John Pierpont "J.P." Morgan most notably, tried to engineer harmonious relations between carriers so that competition, and thus price instability, could be eliminated. These efforts, aided by government legislation such as Interstate Commerce Act of 1887, achieved varying degrees of success in the late nineteenth century. Because lasting harmony among anthracite carriers was not achieved until 1898, the D,L &

W took other actions to achieve stability. Primary among these were the acquisition of small, independent coal producers and carriers so that coal tonnage on the railroad's lines could be guaranteed.⁸ This sort of growth has been characterized as "defensive" system-building because the railroad managers who pursued it formulated their strategies "more on the moves of their rivals than on any careful estimate of the demand for transportation."⁹

ENTERING THE TWENTIETH CENTURY

It has been suggested that by the end of the nineteenth century U.S. railroads in general were extremely overcapitalized:

...the frenzied constructions of the seventies, eighties, and nineties, viewed not as immediately profitable speculative achievements, but in the calmer circumstances of earning an operating profit, had produced in most areas of the nation too intensive a distribution of rail service for the actual traffic available.¹⁰

This over-saturation of the railroad markets brought decreased rates and profits to the carriers. The anthracite railroads, of which the D,L & W was one of the five largest,¹¹ had their own particular burdens as well. Jules Bogan has written that the anthracite railroads' attempts to

"control absolutely an adequate tonnage of coal for [their] lines....dominated their history and exerted the determining force in shaping their policies. It permitted these railroads to grow steadily up to a certain point and then, owing to the burden of carrying a vast and often unprofitable real estate investment, halted their further expansion."¹²

Old strategies of buying up anthracite producers and carriers would not off-set the problem of steadily lowering freight rates; the only solution for the anthracite roads was to obtain a larger portion of the freight shipping market.

Though the D,L & W was still profitable in the last ten years of the administration of Samuel Sloan (1888-1898), that administration had generally failed to pursue new markets: the D,L & W's annual tonnage held between 6 and 6.7 million tons each year during that period.¹³ President Truesdale moved to reestablish the railroad's heretofore phenomenal earning power by cultivating new kinds of freight traffic, other sources of traffic for its roads, and increasing terminal business, especially at Hoboken and Buffalo. Jules Bogen's 1927 account of the D,L & W tells us that Truesdale did this by demanding a high level of economic efficiency in the road's operation and by using only surplus earnings rather than new financing for the improvements he dictated. Truesdale planned improvements that he believed would reap long-term returns rather than immediate profits.¹⁴ It is this agenda that we see reflected in the D,L & W's massive Hoboken terminal, their extensive Hoboken-New York City ferries and piers, the huge cut-offs in Pennsylvania and New Jersey, and in the modernization of the Scranton yards.

THE SCRANTON YARDS

Before coming to the D,L & W in 1895, William Truesdale was vice president and general manager of the Chicago, Rock Island and Pacific Railroad. He was the first president of the D,L & W to have a background in railroad operation and his hiring may have been implemented by William Vanderbilt who, like J.P. Morgan, regularly chose experienced career managers to head the roads they directed. ¹⁵ The previous administration had kept freight cars small, and tracks and bridges light; Truesdale called for an upgrading of all facilities to accommodate increased freight traffic and new, larger locomotives, and to guarantee their usefulness far into the future. By 1910, all D,L & W shops that had existed in 1898 had been replaced or remodeled, and these shops were so well designed that they served the railroad until the end of the steam era some 30 years later.

By 1880, the D,L & W had established a through route from Hoboken to Buffalo. Though the geographical half-way point between the two terminals was Binghamton, New York, Scranton, previously a mid-sized yard, became a major division point on the line for several reasons: the city is set in a deep valley and significant grades rise twenty miles eastward to Gouldsboro and eight miles westward to Clark's Summit; nearby coal mines of the D,L & W and other companies, and the commercial freight business associated with Scranton, assured that locomotive use over these grades would

be heavy and constant. Significant routine maintenance was thus needed in the valley and, by Truesdale's estimates, this need would increase.¹⁶ Locomotives almost 50 percent larger than those used in the nineteenth century made the existing Scranton shops, built on South Washington Avenue in the 1850s, inadequate for all but a few engines.

Because geography limited the size of the D,L & W's facilities in Scranton proper, certain operations had been relegated to other sites. The ultimate arrangement of facilities reflects Truesdale's notions of efficiency and economy for locomotive maintenance and repair. He required that locomotives be out of service for as little time as possible; thus daily maintenance and more major repairs were all to be accomplished in close proximity to the switching yard and freight station in central Scranton so the engines did not spend travel time to and from the repair shop. Steel and iron manufacturing, in addition to coal mining and railroad traffic of all kinds, had made Scranton a wealthy city that grew from 35,000 people in 1869 to 100,000 in 1900. Retailing and manufacturing were thriving; textile mills in particular flourished as sources of employment for the wives and children of miners.¹⁷ It was Truesdale's intention to provide the most efficient freight service possible to these businesses, and therefore the yard tracks in Scranton were earmarked for fast freight, freight for the downtown area, and "l.c.l" (less than carload) freight.¹⁸ Though this goal alone was enough to dictate central Scranton as the best place for new locomotive shops, the presence of a large

cheap labor force in the town was also an advantage: workers could walk to the yards. Thus Truesdale ordered a twenty-three-acre, \$2-million series of shops and auxiliary structure for the care and repair of steam locomotives to be built adjacent to existing yards. It would be, he said, "second to none in the country," and be equipped with "the most modern tools and labor-saving appliances."¹⁹ Bridges and signal and switching facilities in the yard were commensurately enhanced. In the same decade, all freight car work was consolidated at the D,L & W's Keyser Valley shops, completed in 1904 at a site about two miles from downtown Scranton, and all passenger car work was consolidated in the Kingsland, N.J. shops, completed in 1906. The routing of coal cars was centered at the Taylor and Hampton yards, both about two miles outside of central Scranton.

The design of the new and improved facilities for the Scranton yards was supervised first by William McFarlin, then by Lincoln Bush, and finally by George Ray, each in the position of chief engineer. Bush, born in Illinois in 1861, worked for various railroads and canal companies before coming to the D,L & W in 1899. As chief engineer from 1903 to 1909, he refined the use of concrete and pile footings for track structures. Bush is best known for designing the "Bush Train Shed," a series of canopies that replaced the single, vaulting roof previously used to cover trains. ²⁰ Under Bush, work was begun on the New Jersey (or "Slateford") Cut-off. The project's 73 bridges, culverts, 3 stations and 3 interlocking towers used refinements in reinforced

concrete construction methods that William McFarlin developed while elevating the D,L & W's suburban New Jersey tracks in 1902.²¹ George Ray, born 1876, also from Illinois, entered railroad employ in 1898, replacing Bush as chief engineer in 1909.²² Ray supervised construction of the D,L & W's massive Pennsylvania (or "Nicholson") Cut-off, including the famous Tuckhannock Viaduct of 1915. The towers and stations of this period were in large part designed by Frank Nies, and as mentioned, reproduced in many locations from identical plans. One-of-a-kind structures, such as the gas house and scrap platform of the Scranton Locomotive Shops (1908), are notable for their logistical connections: standard tracks, narrow gauge subway tracks and overhead cranes were included in their design to streamline traffic of men and materials between them.

SLOW DECLINE OF THE D,L & W

By the end of the Truesdale administration in 1925, the demand for anthracite had shrunk considerably from its high in the 1880s. Soft, or bituminous coal, was cheaper to burn than anthracite, in part because protracted strikes by anthracite miners in 1922 and 1925-26 had stimulated the development of improved technologies for the use of soft coals.²³ Gas and oil were emerging, as well, as increasingly affordable fuels for home and industry. Like many other towns tied to coal, Scranton began to decline. All these developments boded ill for the D,L & W. Truesdale had made extensive plans to electrify, and thus speed up, portions of the

D,L & W's lines, and electrification of its suburban New Jersey lines did take place in 1930, but by 1924 even Truesdale admitted that passenger and local freight traffic had been seriously reduced by the proliferation of private vehicles and new roads.²⁴ To a degree, the railroad's decline can be attributed to increasing government regulation in the 1910s and '20s. The ICC's immense valuation project, in which the "true" material value of U.S. railroad property was assessed, resulted in reduced allowable rates, and anti-monopoly laws prompted the D,L & W to dispose of some of its securities in other railroads. New accounting laws that called for enlarging office staffs and hence administrative costs were instituted by the ICC, and if President Truesdale's vocal complaints are to be believed, severely strained revenues by inflating personnel costs.²⁵

The impact of the ICC's segregation laws, which prohibited a carrier from shipping commodities in which it had a legal interest, are not easy to measure. It was designed to prevent the coal railroads from shipping their own coal. However, according to Jules Bogen, writing in 1927, a 1909 segregation of D,L & W coal production and coal carrying operations into separate companies had not really affected a separation at all because the same people owned stock in both companies. A 1915 Supreme Court decision found that the D,L & W had violated the Sherman and Hepburn anti-trust acts, and in compliance, the D,L & W sold off its coal interests to the newly formed Glen Alden Coal Company in 1921. The railroad was now dependent on its income as a carrier, but it held the \$60

million mortgage on the Glen Alden Coal Company and received income from that mortgage. Bogen believed the railroad showed "large earning power" in 1927.²⁶

A 1980 analysis of the D,L & W by Thomas Taber states that the impact of the segregation laws on the railroad was significant because the road "lost control of what to do with its profits, which formerly could be used for anything on the railroad or given out in dividends."²⁷ Robert Carson writes, perhaps overgeneralizing, that whatever actions the government took, the railroads would still have gone into a decline. He believes that the officers, directors and bankers responsible for the large eastern railroads had little real understanding of the traffic flow and transport on their lines: "Physical network's relationship to structural changes in flow and demand were never really understood."²⁸ Whether he did it because he did not understand traffic flow or because the development of alternative fuels and freight systems was simply unforeseeable, by the end of his term Truesdale had prepared the D,L & W for long-term increases in freight traffic that did not materialize. The advent of diesel locomotives in the 1940s and '50s rendered much of the D,L & W physical plant obsolete, but the diesel engines could not compete with truck and air freight transport for economy, especially as the interstate highway system developed extensively in the 1950s. A 1960 merger of the D,L & W with the Erie Railroad was a complete failure, and the resultant company went out of business in 1972. The Scranton yards were purchased by the Consolidated Rail

Corporations (Conrail) in 1976, and largely abandoned. In 1986, the yards and associated equipment were designated a National Historic Site, and today, the National Park Service is in the process of redeveloping the yards. Steam era rolling stock is displayed there. Many D,L & W structures that remain in whole or part will be rehabilitated for interpretive purposes.

THE HAER PROJECT AT STEAMTOWN

The structures at the D,L & W's Scranton Yards (now a component of the Steamtown National Historic Site) documented by the Historic American Engineering Record team in the summer of 1989 include the following:

Bridge 60	Scrap Platform
Switchman's Shanty	Gas House
Track Scales	Washington Avenue Bridge
Coal Trestle	Mattes Street Signal Tower
Oil House	Cedar Avenue Bridge

The functioning of these buildings, bridges and machinery installations required frequent inter-communication. Consequently shop layout, subway construction and worker traffic patterns were significant elements of the D,L & W's 1898-1925 modernization program and merit more detailed documentation than these reports have been able to provide. Further, those structures built as part of the Locomotive Shop complex of 1909-1911 (the gas house, scrap bins and subway system) are best understood when examined in the

context of those shops, which are now occupied by private manufacturers and are not included in this study. All the structures in the Scranton yards that date from the twentieth-century steam era were built to exacting standards; the use of concrete in the shops, bins, gas house, coal trestle, and bridge abutments involved extensive materials testing in the D,L & W's Scranton laboratories.²⁹ Examination of the uses of other materials in the yards would no doubt be of equal historical interest. The technologies surrounding concrete preparation and pouring at the D,L & W also await investigation. Finally, further study of the general routing of yard traffic, switching equipment, signals, track arrangements, subways and maintenance facilities, including the ash pits and sand tower, that were not examined this year will certainly yield new information about the D,L & W's operation, growth and decline.

Among the resources used for this project are original documents: drawings, plans and written records and extensive contemporary writing in railroad and engineering trade journals. These materials are listed in the bibliographies assembled for the HAER reports. The Interstate Commerce Commission in Washington maintains many of the field notes and final reports of the 1918 valuation of the D,L & W's properties, though drawings for the ICC valuation are believed to have been destroyed. The George Arents Research Library at Syracuse University holds some D,L & W corporate records, as do the archives of the Hagley Library in

Wilmington, Delaware. The Arents Library also has a large collection of glass negatives taken by the D,L & W in the early twentieth century. The Transportation Department of the National Museum of American History, of the Smithsonian Institution, has a number of drawings of D,L & W structures. Steamtown National Historic Site is developing its collection of archival material; private collections and former D,L & W employees were also instrumental in preparing this study.

NOTES

1. Robert B. Carson, Main Line to Oblivion (Port Washington, New York: Kennikat Press, 1971), 6.

2. For discussion of William Truesdale's policies, see Thomas Townsend Taber III and Thomas Townsend Taber, The Delaware, Lackawanna & Western Railroad in the Twentieth Century Vol. 1 (Muncy, Pennsylvania: Thomas T. Taber III, 1980), 17-20; Jules I. Bogen, The Anthracite Railroads (New York: The Ronald Press, 1927), 103-104; and Paul M. Smith "Know Your Railroad: The D, L & W," Locomotive Engineers Journal August 1936, 572-573.

3. Bogen, 76-84.

4. Bogen, 87-89.

5. Bogen, 90.

6. Bogen, 85; Smith, 572.

7. Bogen, 97.

8. Bogen, 102-105.

9. Alfred D. Chandler, The Visible Hand (Cambridge, Massachusetts: Harvard University Press, 1977), 170.

10. Carson, 7.

11. Carson, 15.

12. Bogen, 243.

13. Taber, 253-254.

14. Bogen, 103.

15. Taber, 17; Chandler, 183.

16. The D, L & W did studies in 1907 to determine the number of locomotives that would be needed on the Scranton division over the coming decades. Using the ratio of locomotives to mileage on the busiest railroad of the region, they established that a maximum of 507 locomotives would be used on tracks tributary to Scranton. ("A Modern Locomotive Repair Plant," Railway World Vol. LIII, No. 36, 737-738.)

17. Nicholas E. Petula, Scranton Once Upon a Time (Scranton: Nicholas E. Petula, 1985), 99; and John Beck, Never Before in History: The Story of Scranton (Northridge, California: Windsor Publications, 1986), 77-82.

18. Taber, 237.

19. "President's Letter," D, L & W Annual Report, 1906.

20. Harold Francis Lane., ed., The Biographical Directory of the Railway Officials of America, 1913 edition (New York: Simmons-Boardman Publishing Co., 1913), 78. See Taber, 30 for discussion of the Bush Train Shed. This type of structure was used at the 1908 D, L & W passenger station in Scranton.

21. Taber, 36.

22. Lane, 449.

23. A.J. Johnson, Fuels and Combustion Handbook (New York: McGraw-Hill, 1951), 272. It has been suggested that there was no essentially technical reason for anthracite's displacement as a premium fuel.

24. Taber, 63.

25. "President's Letter," D, L & W Annual Report, 1908.

26. Bogen, 219-222, 107.

27. Taber, 253.

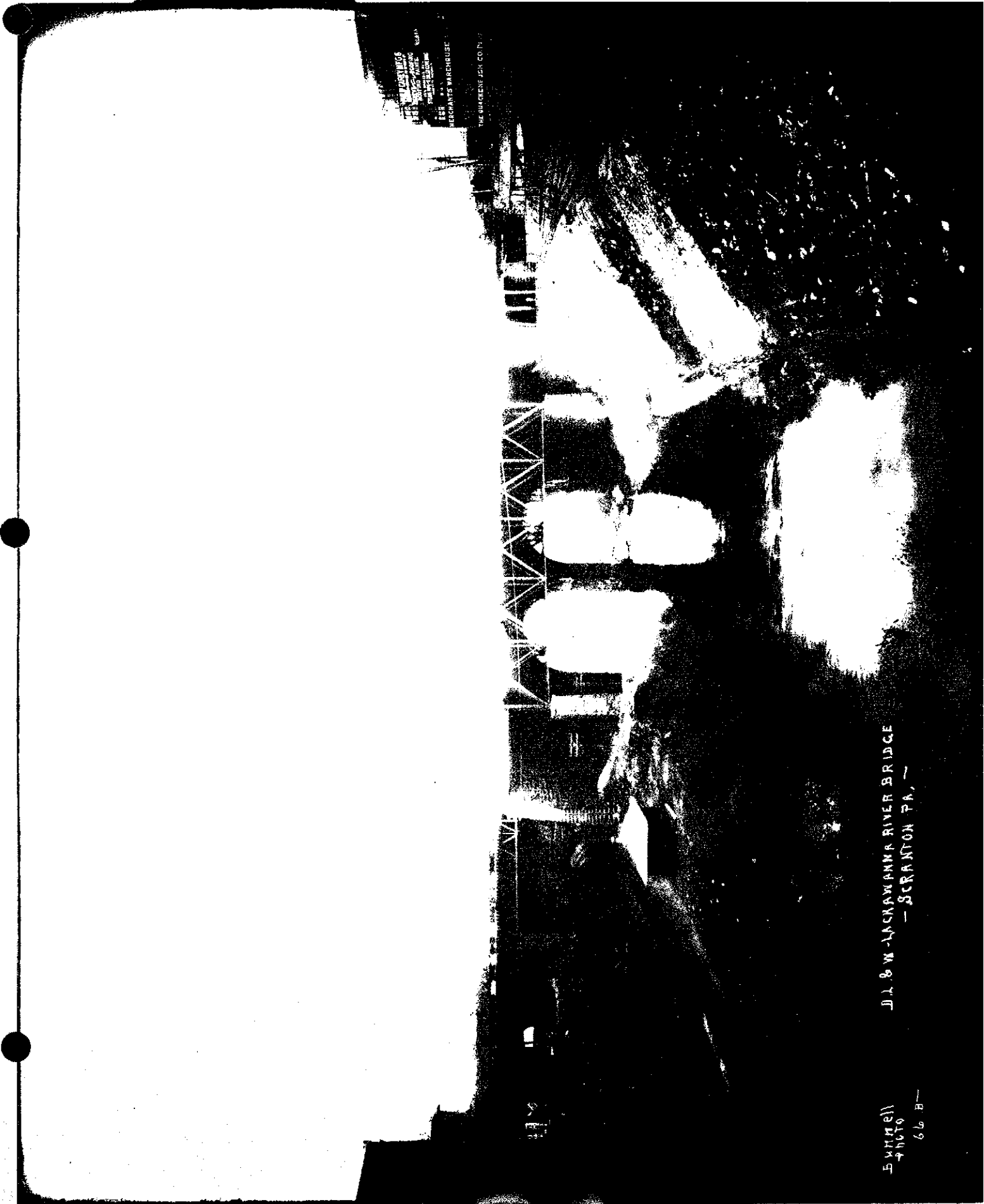
28. Carson, 50.

29. "New Delaware, Lackawanna & Western Specifications for Portland Cement," Railway Age Gazette Vol. 54, No. 4, 158.

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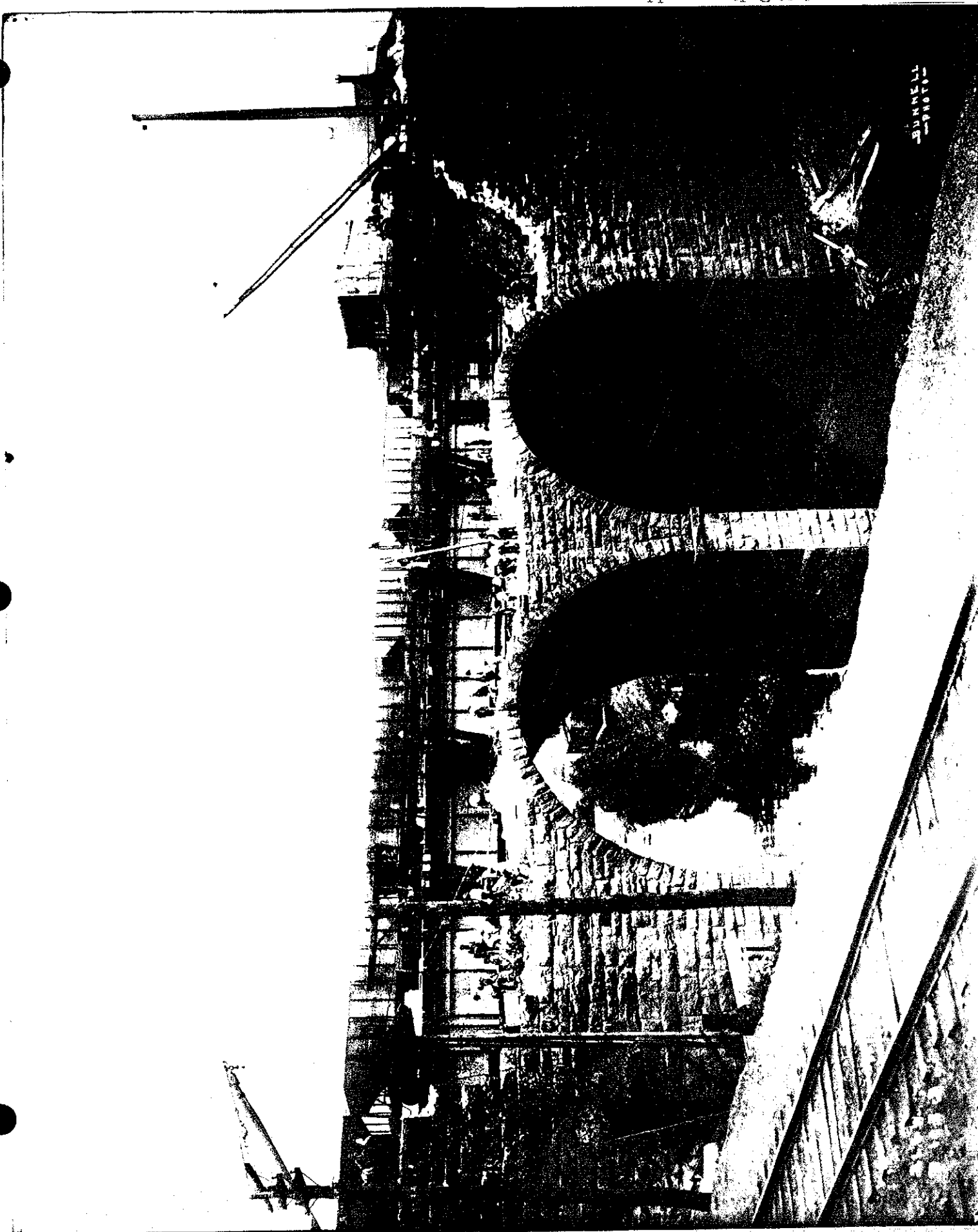


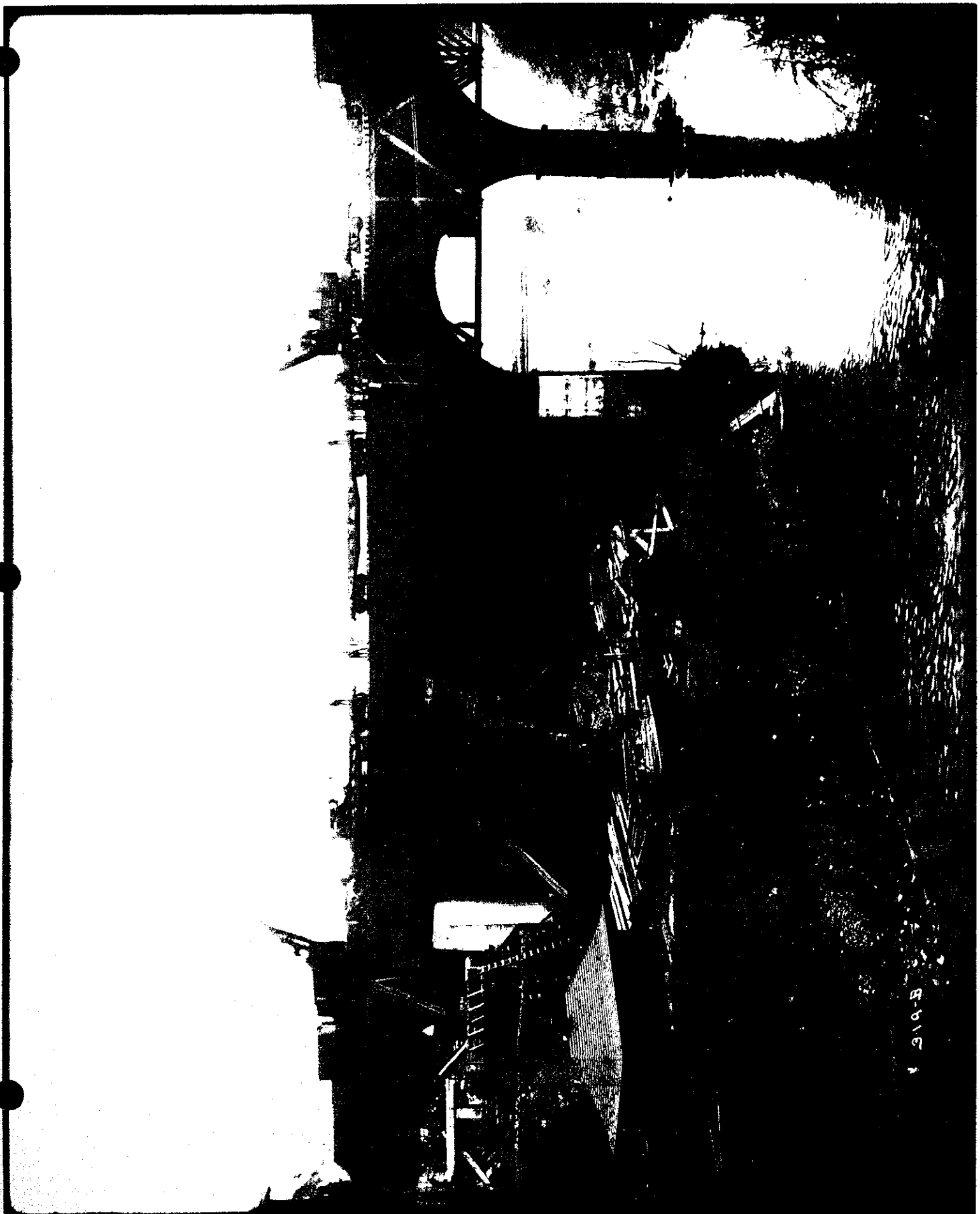


J.L. & W. LACKAWANNA RIVER BRIDGE
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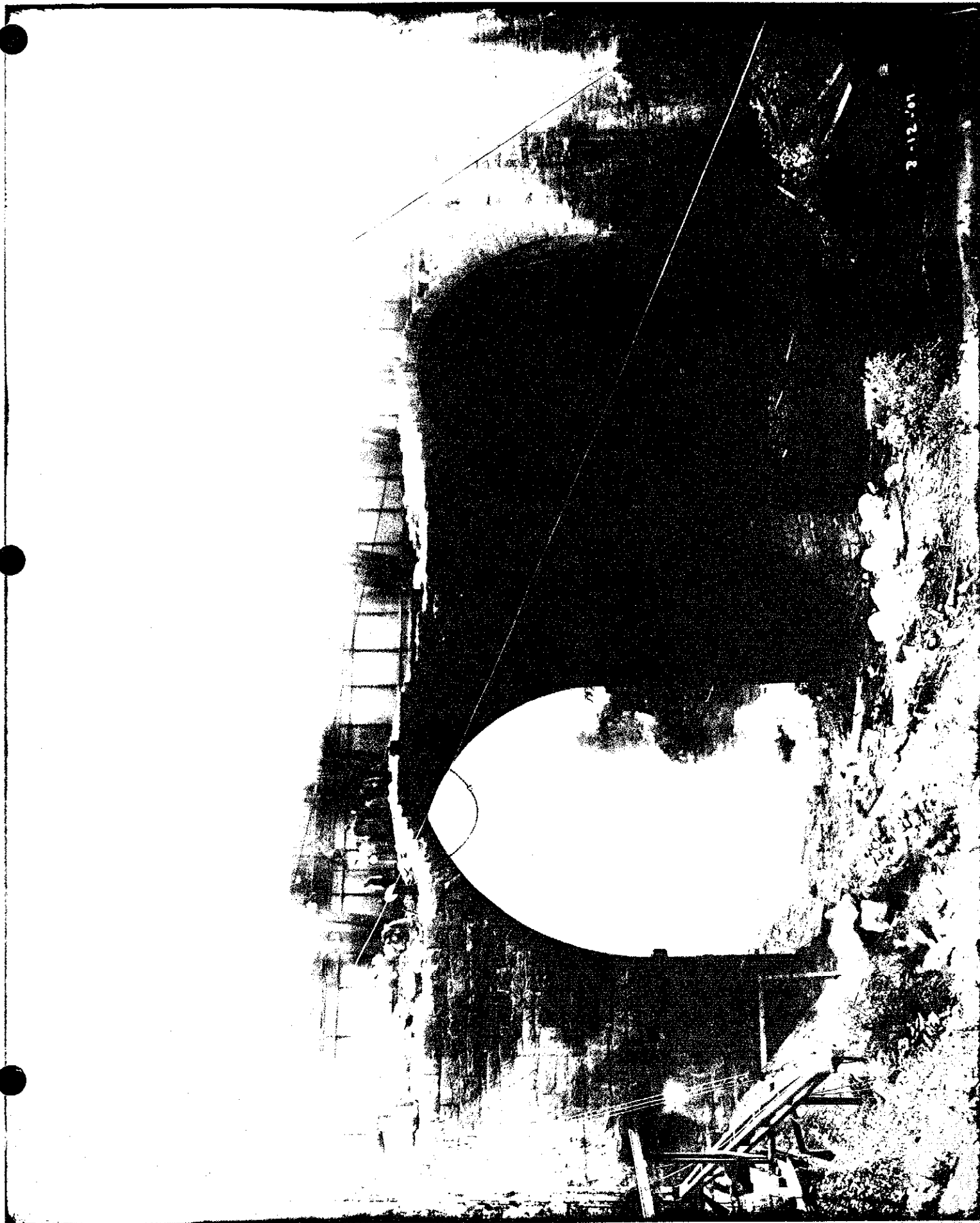
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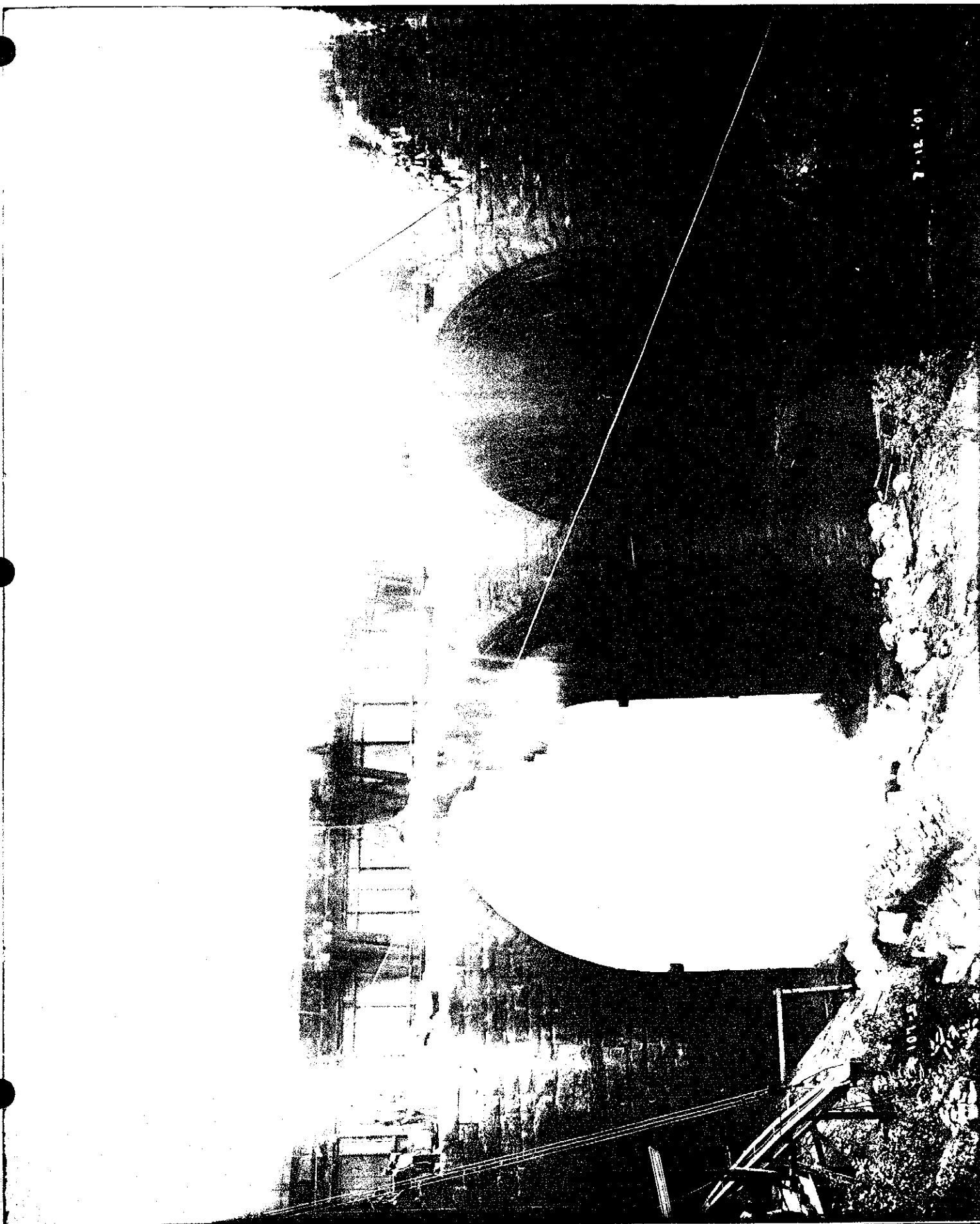


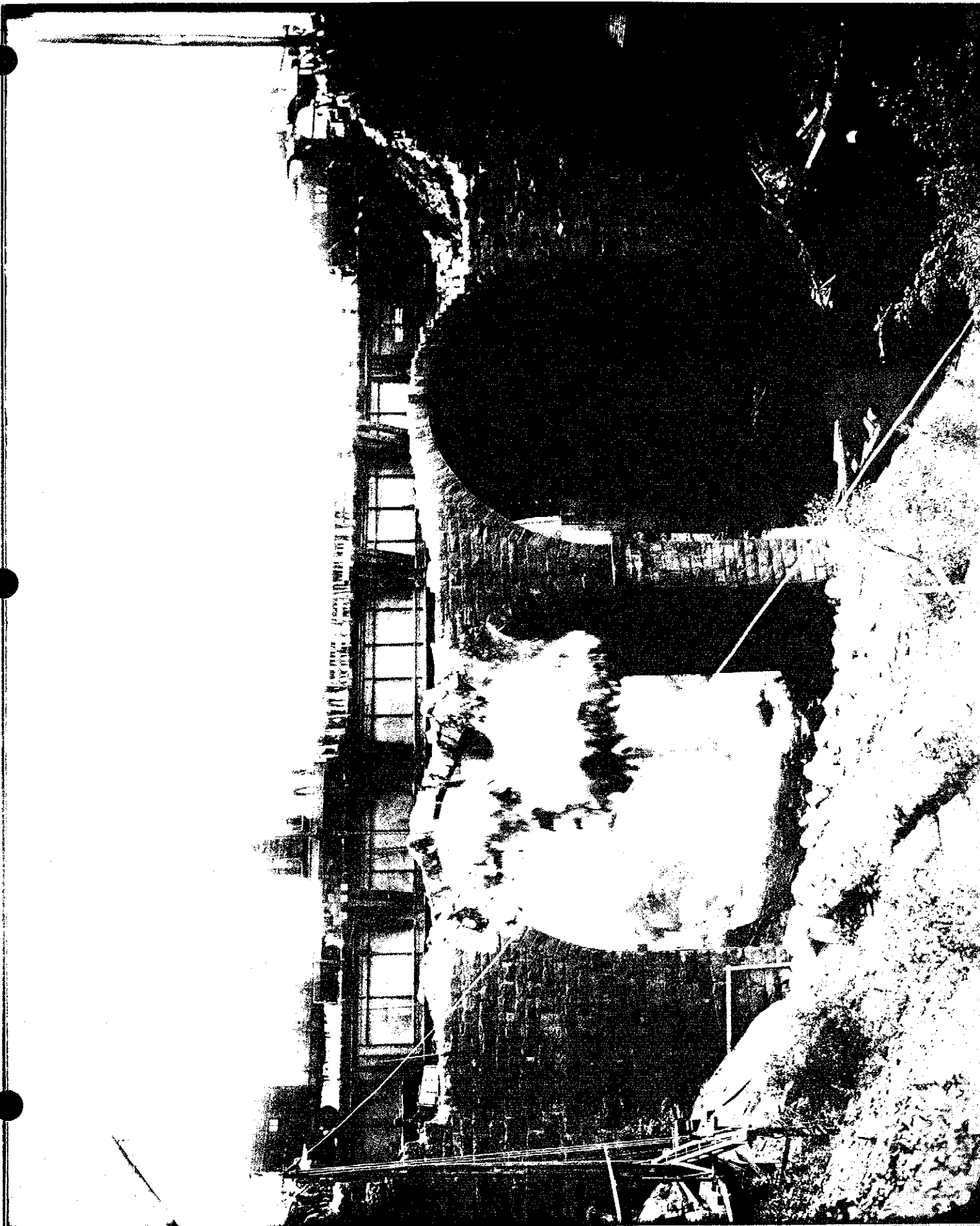


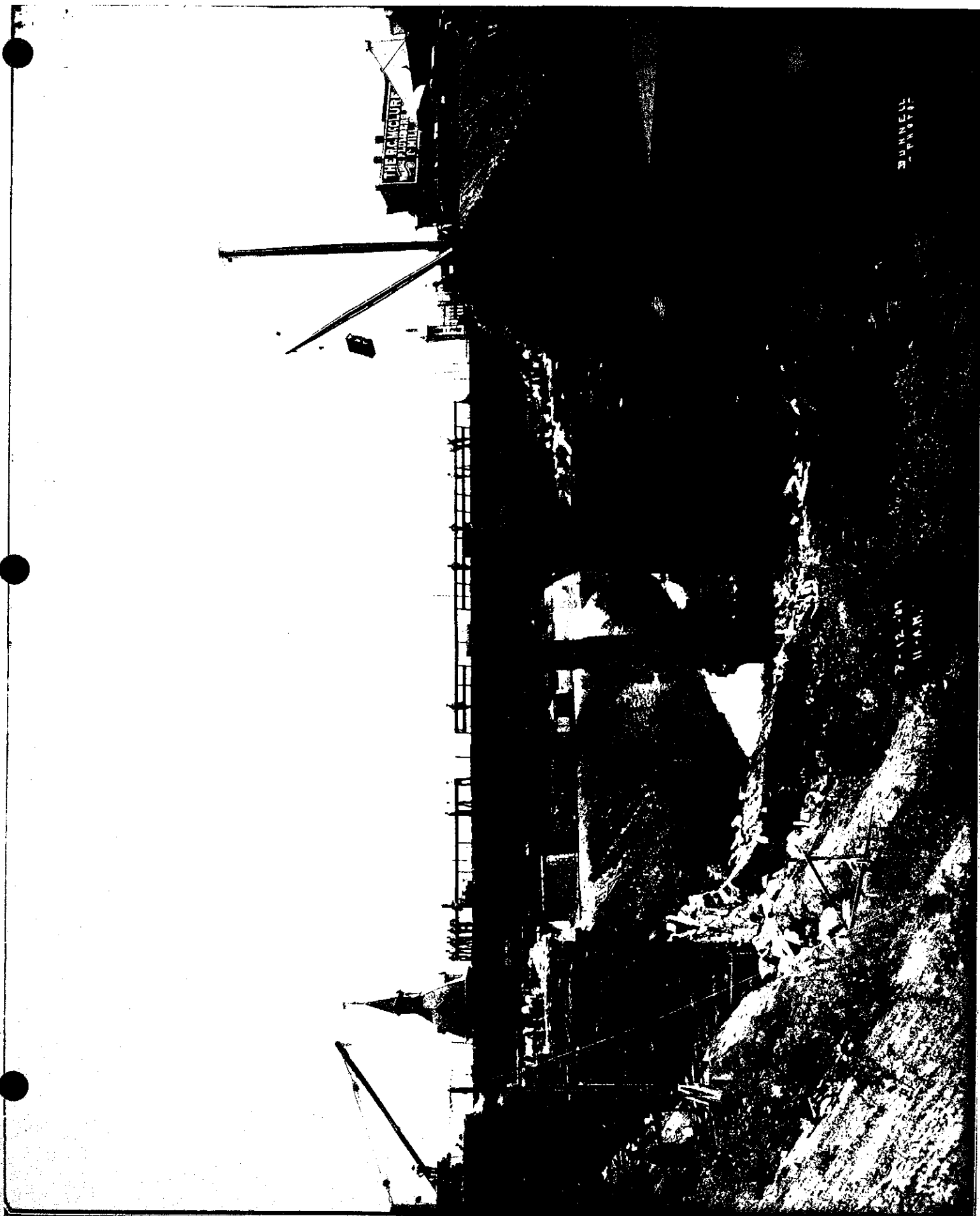


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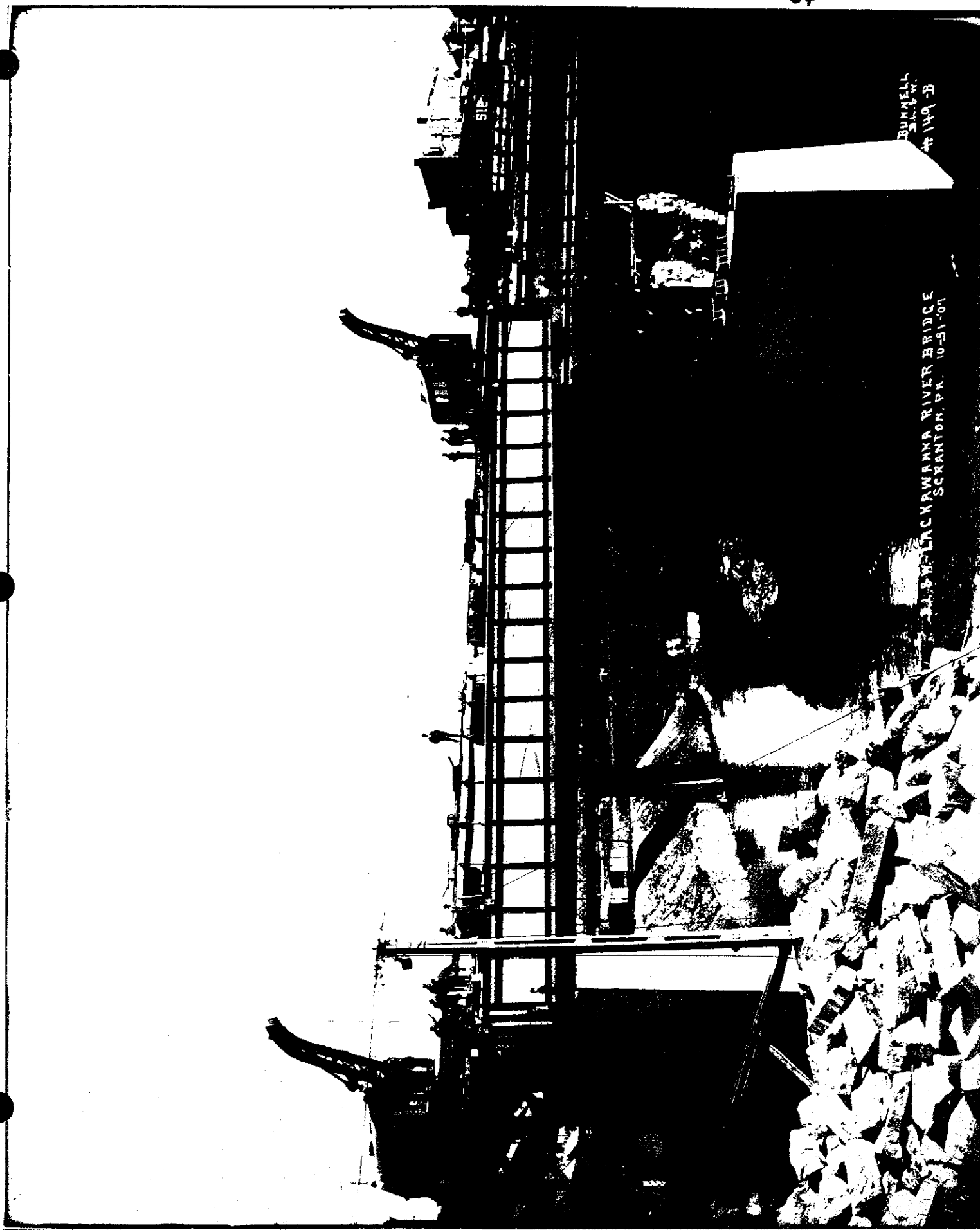






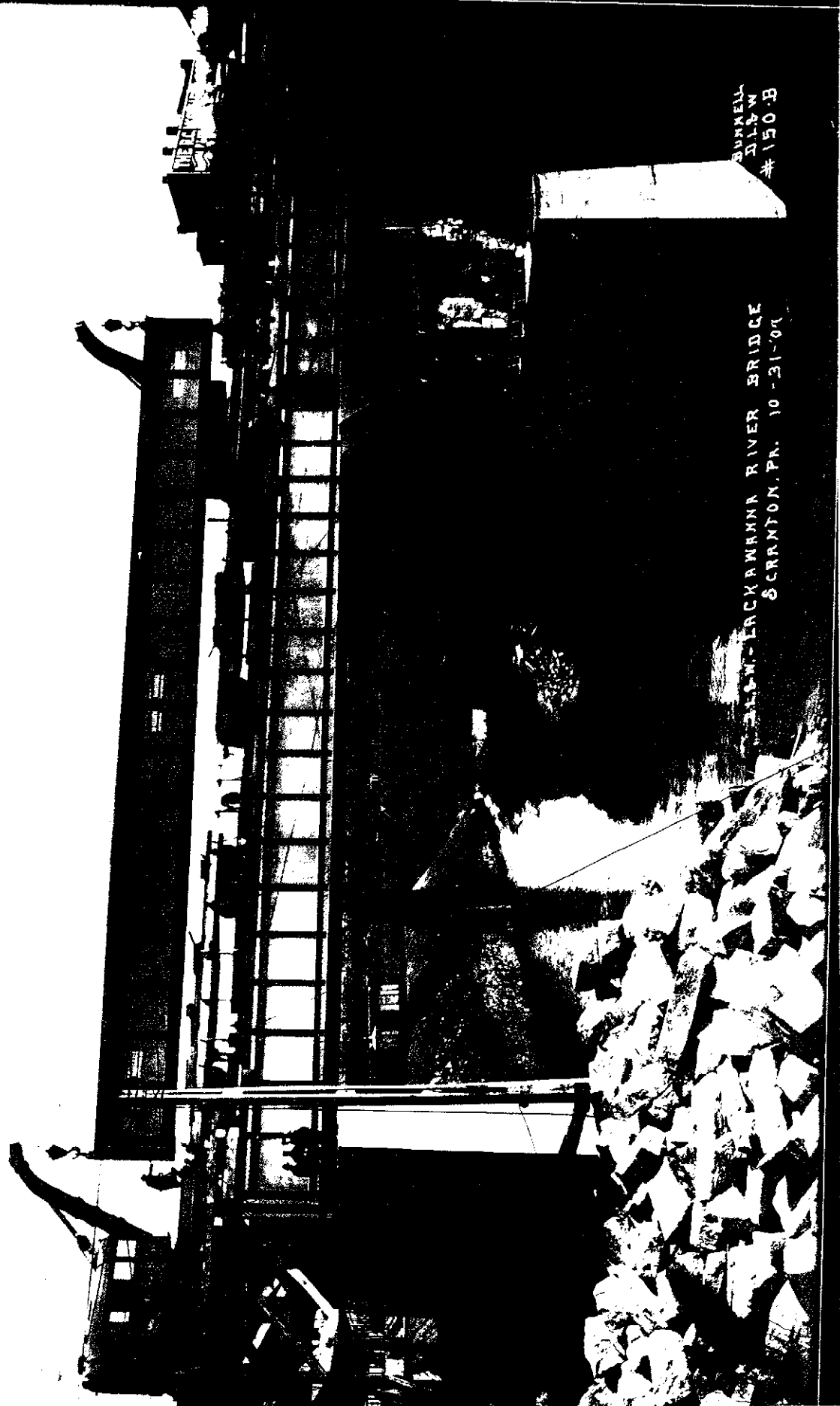
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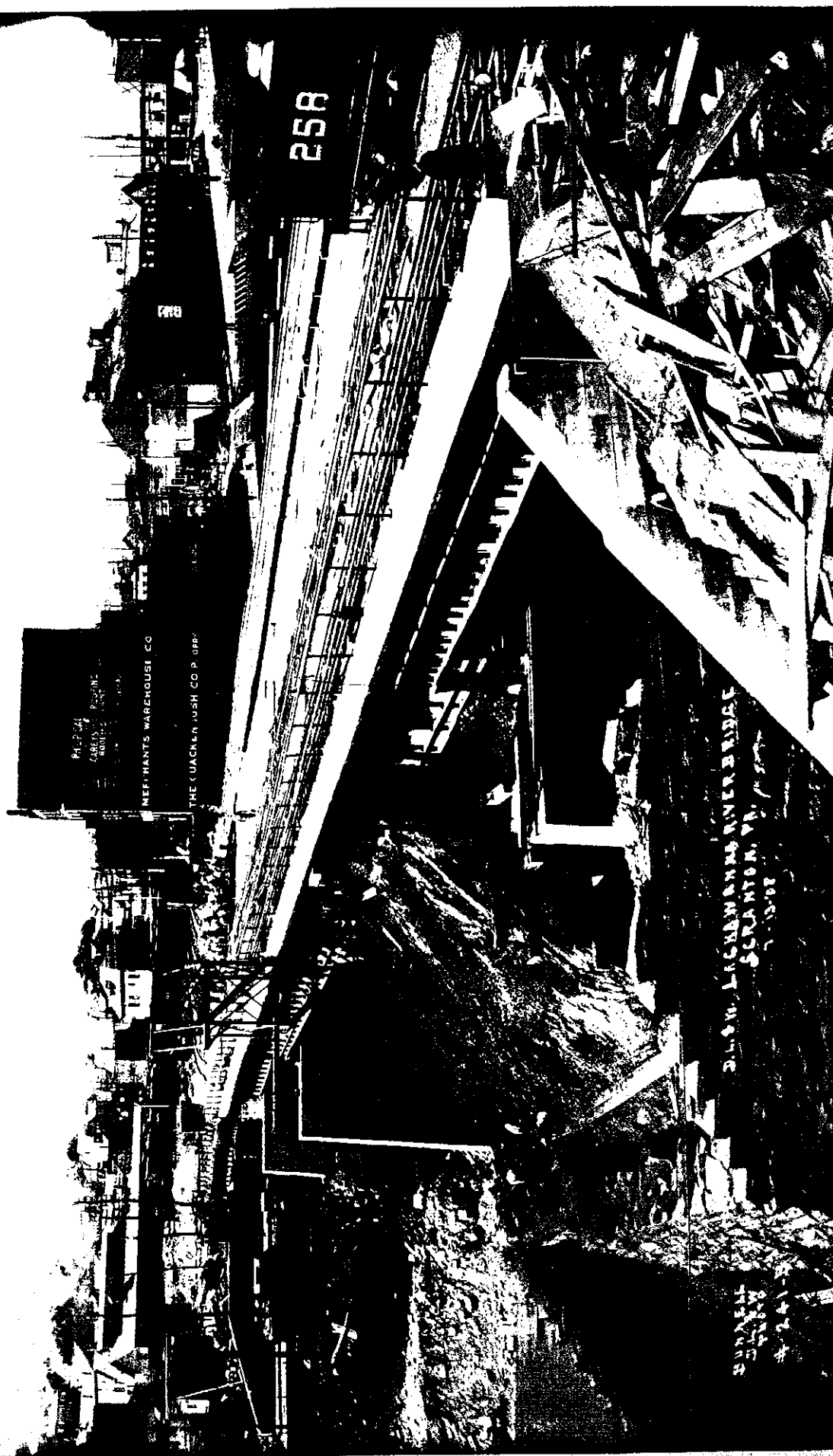
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BUNNELL
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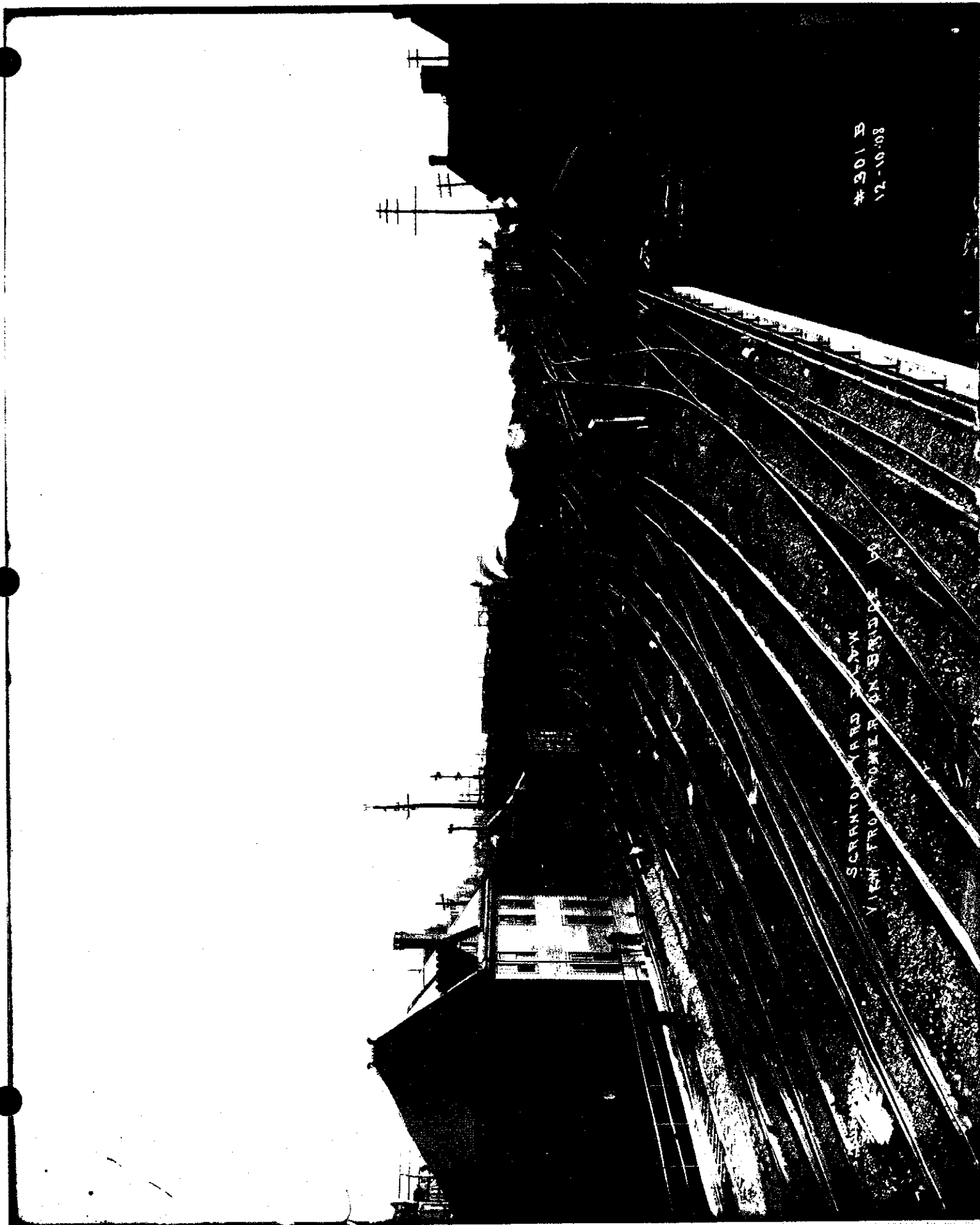
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WELL



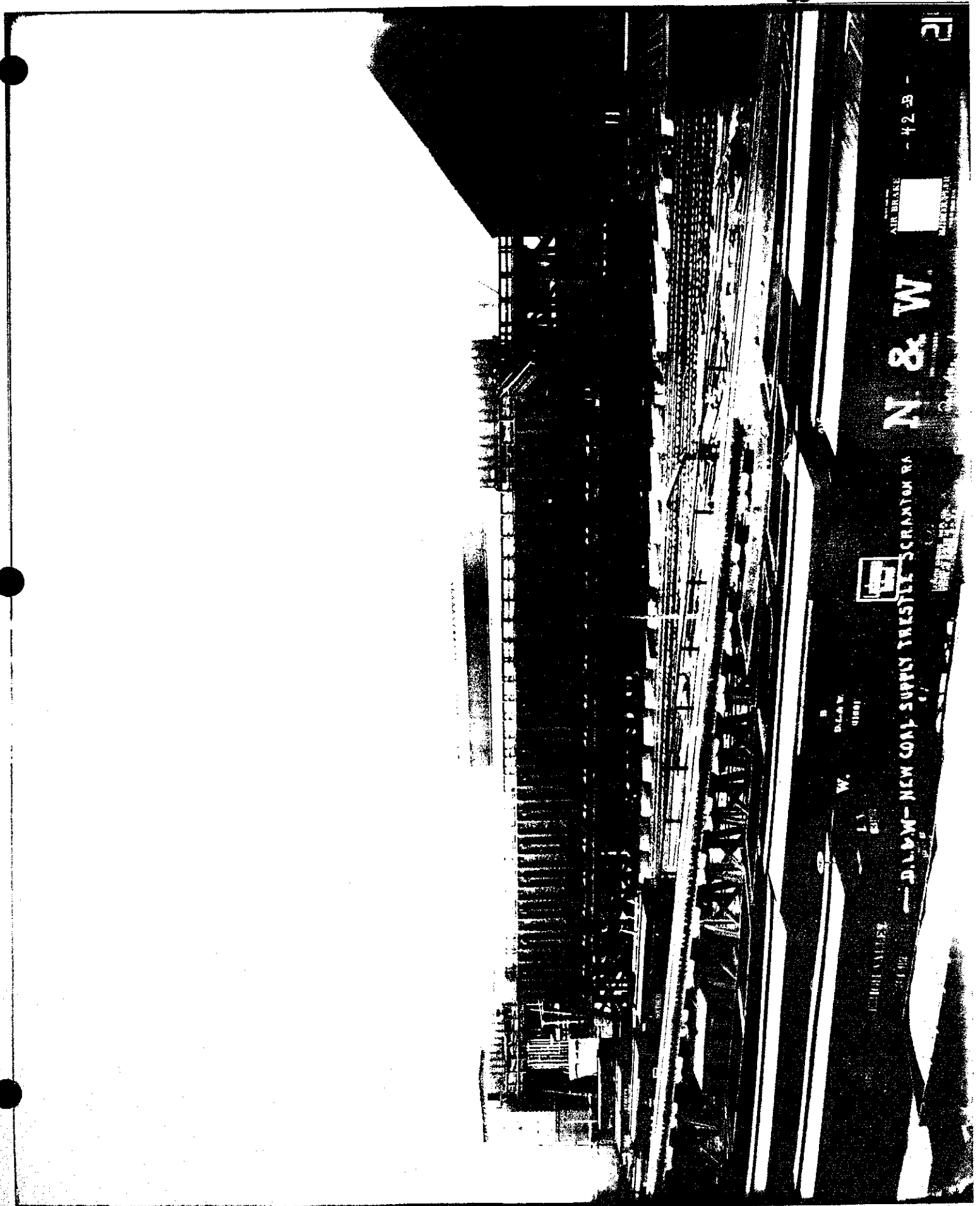


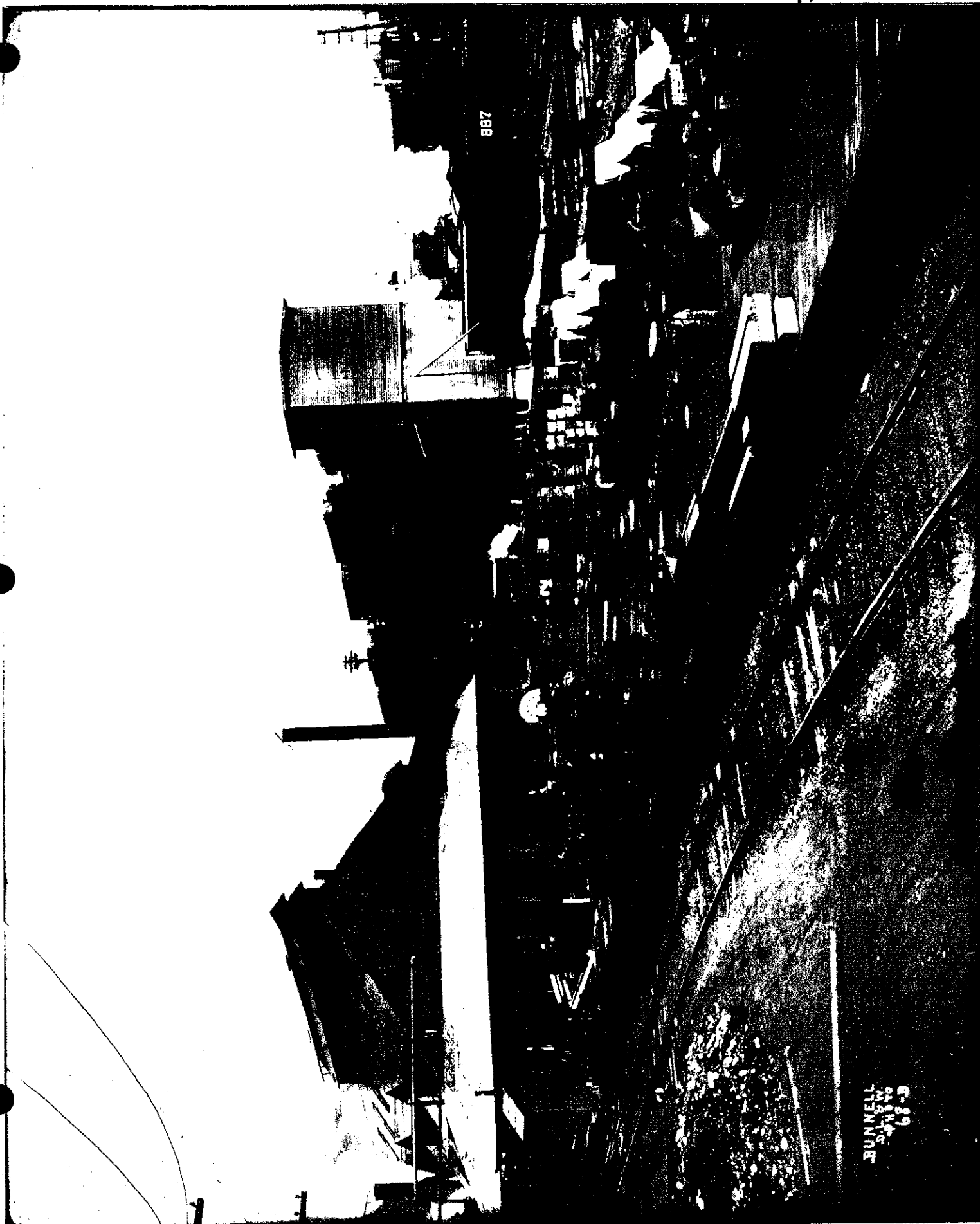




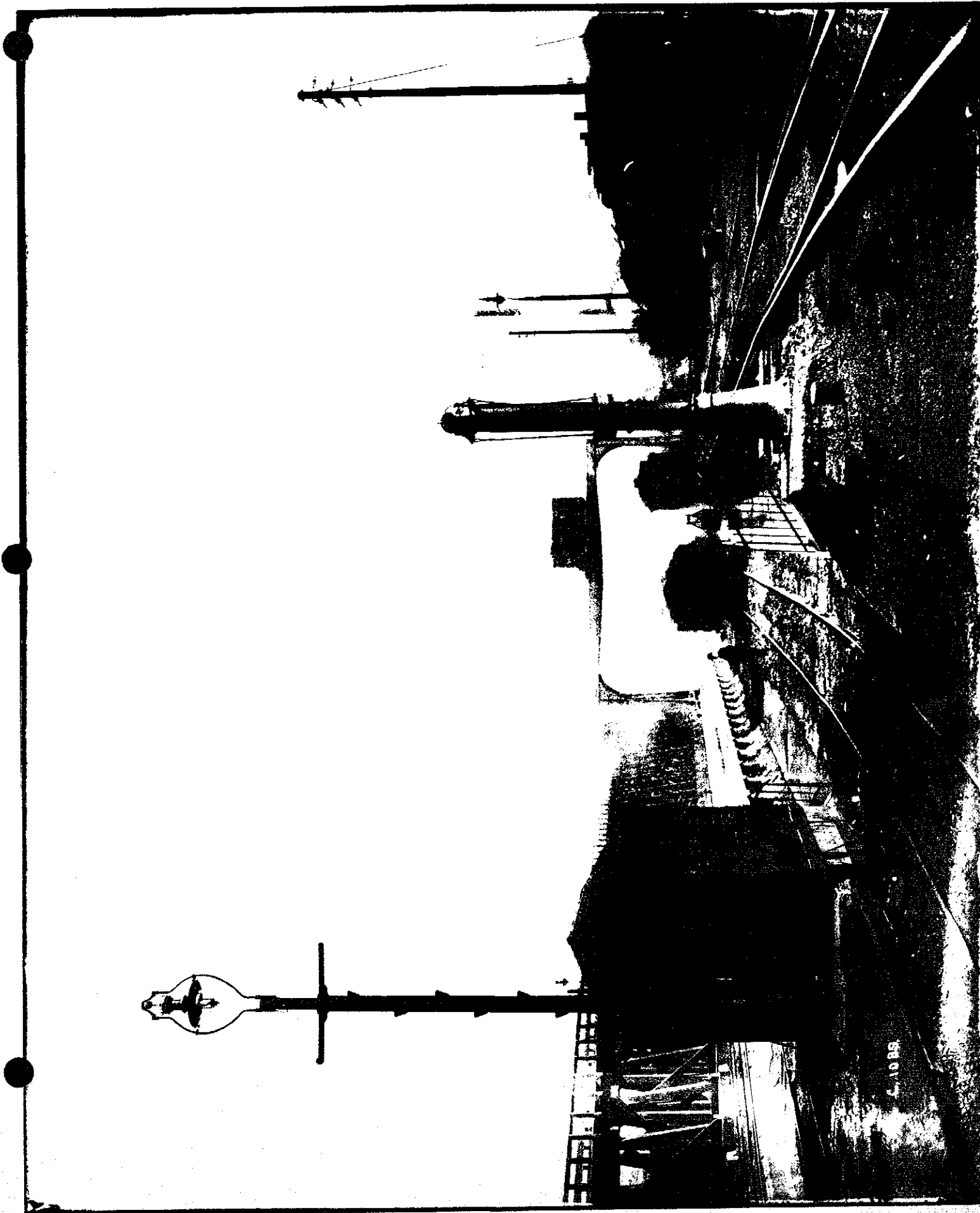
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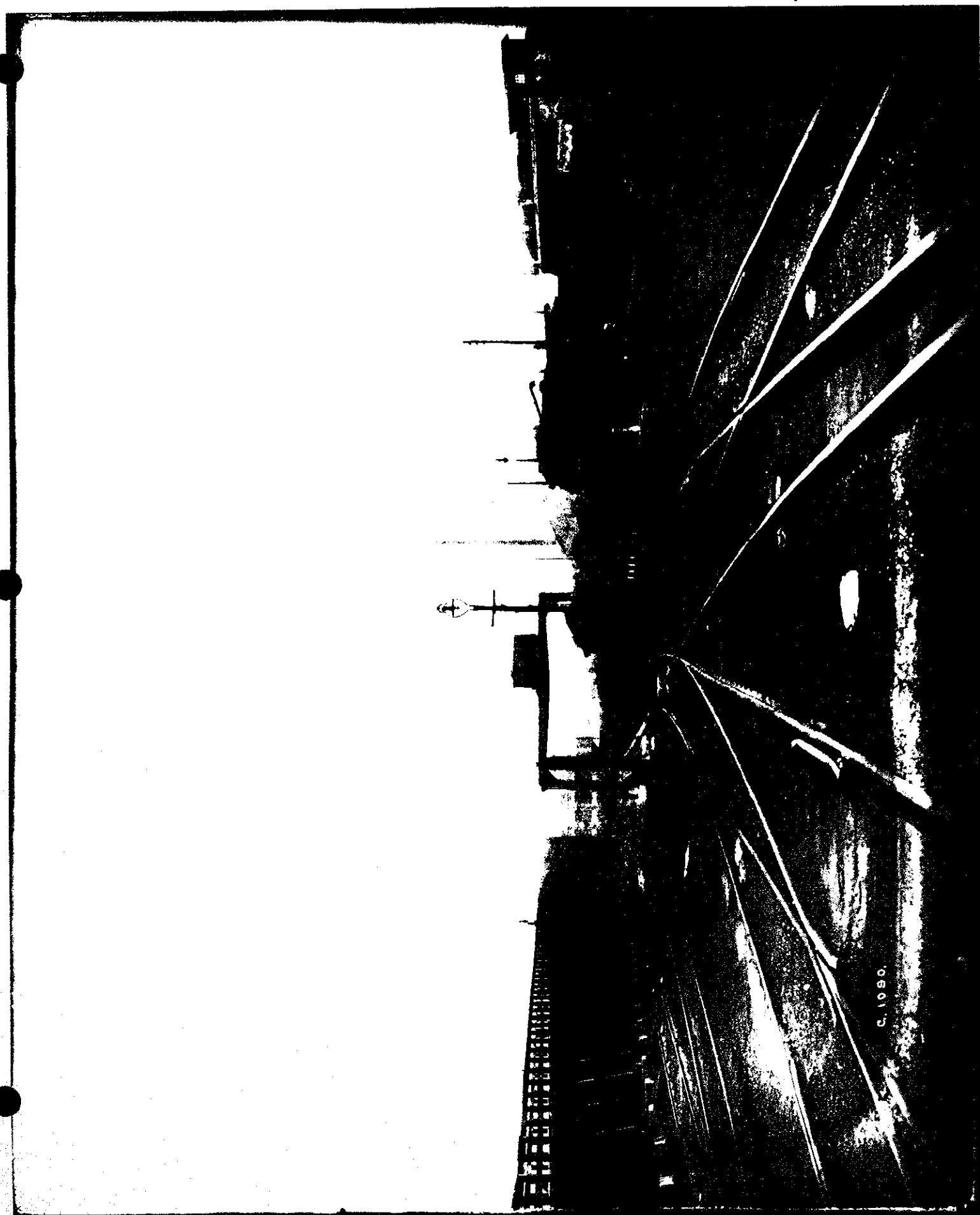
SCRANTON RIVER
VIEW FROM TOWER ON BRIDGE





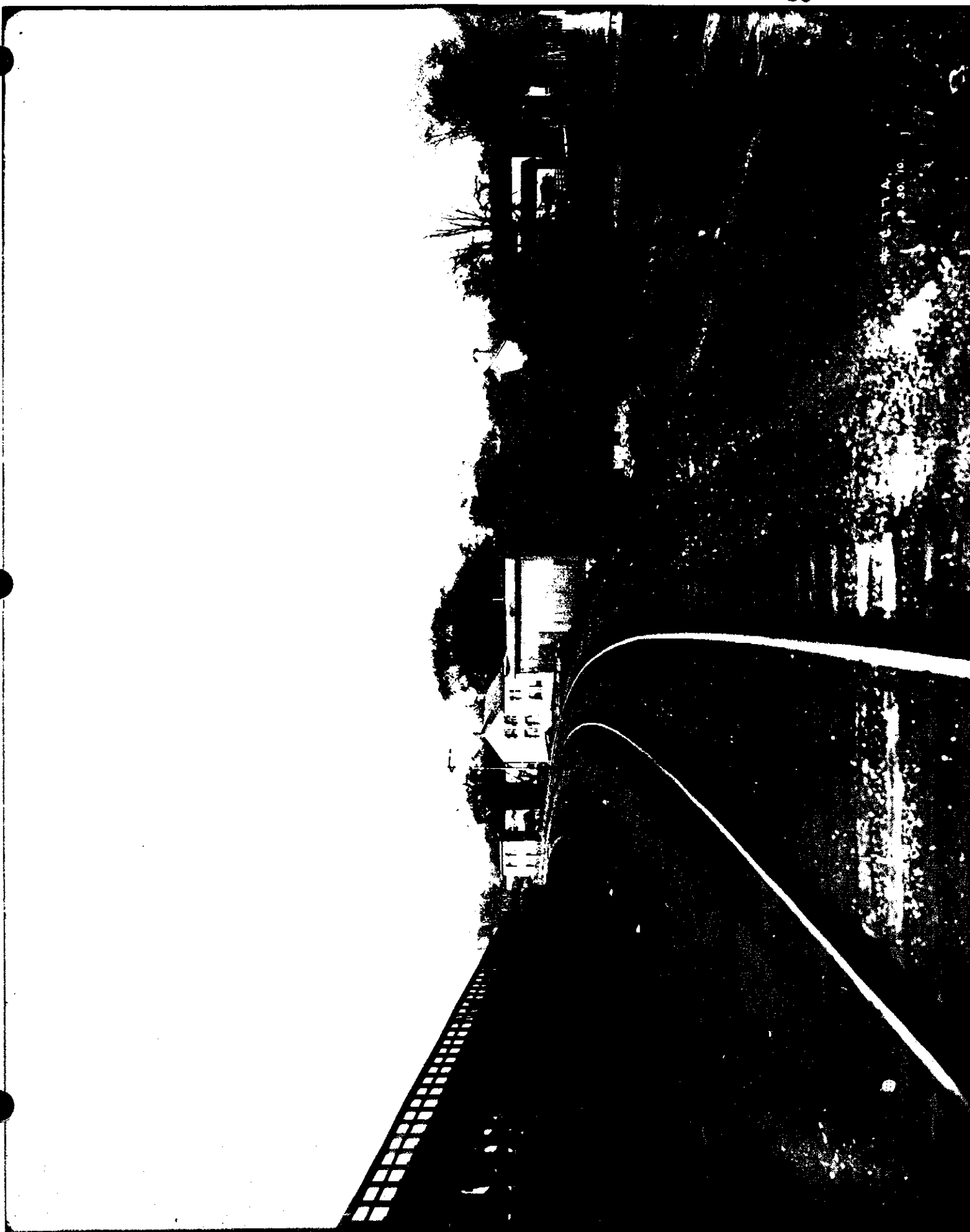






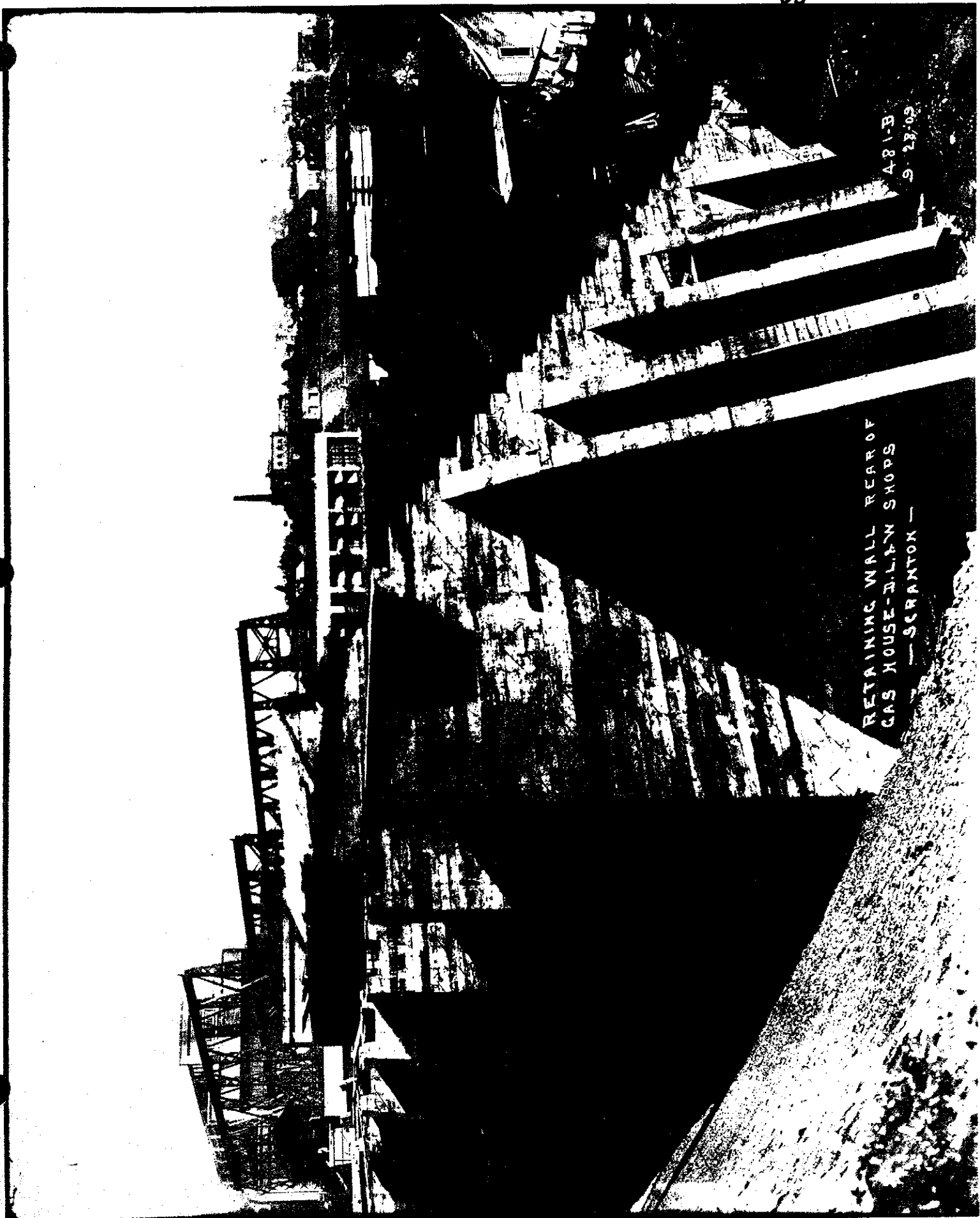


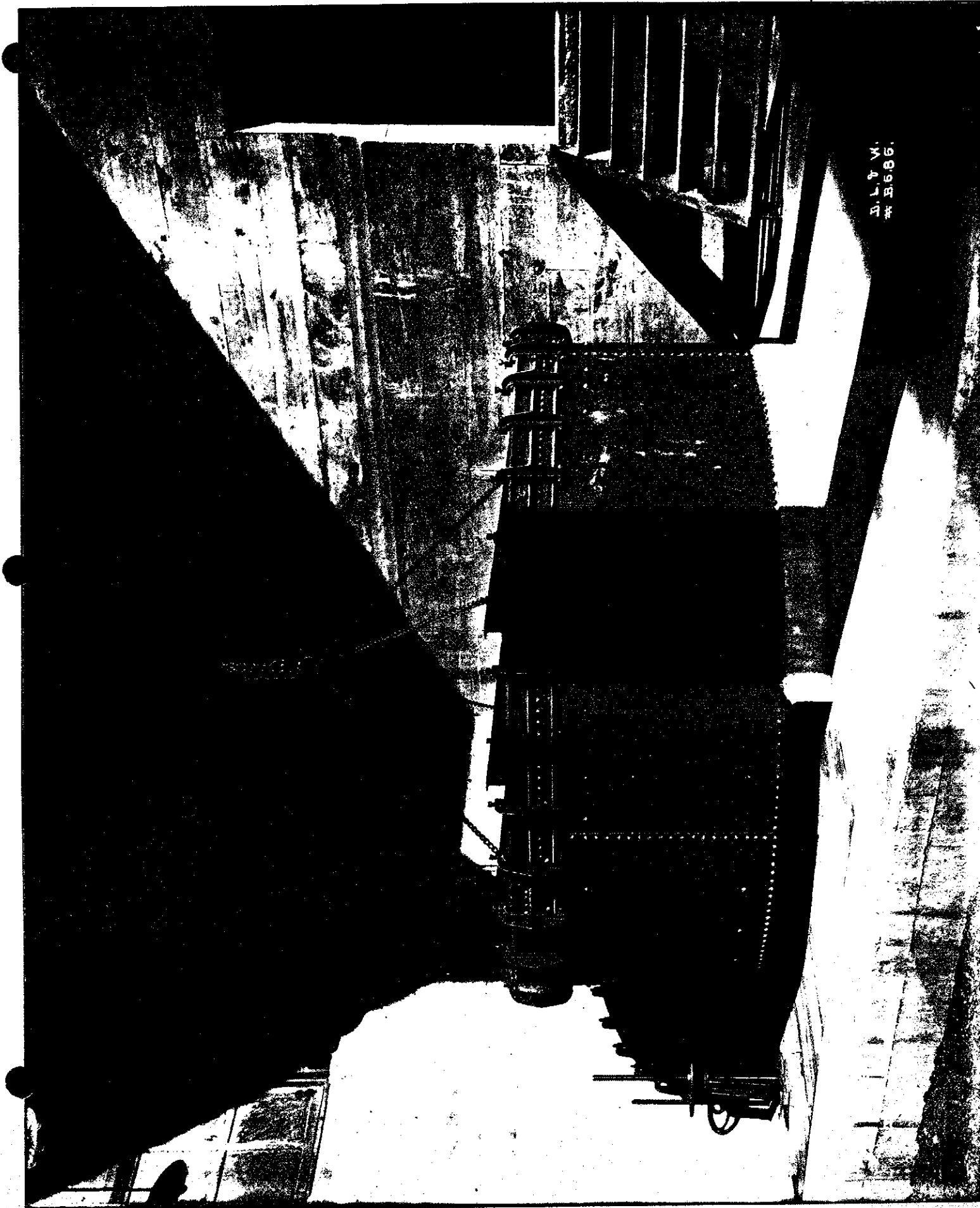










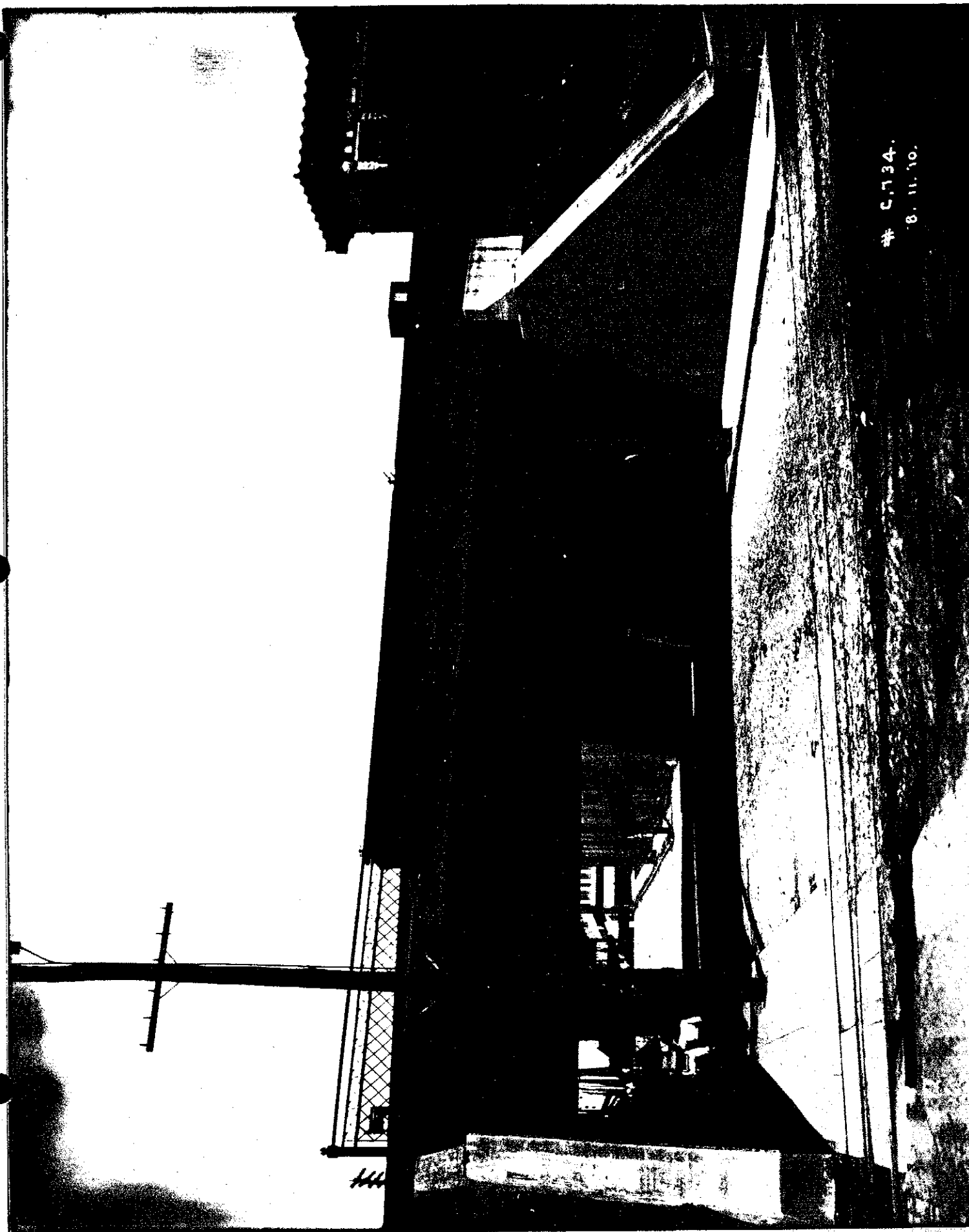


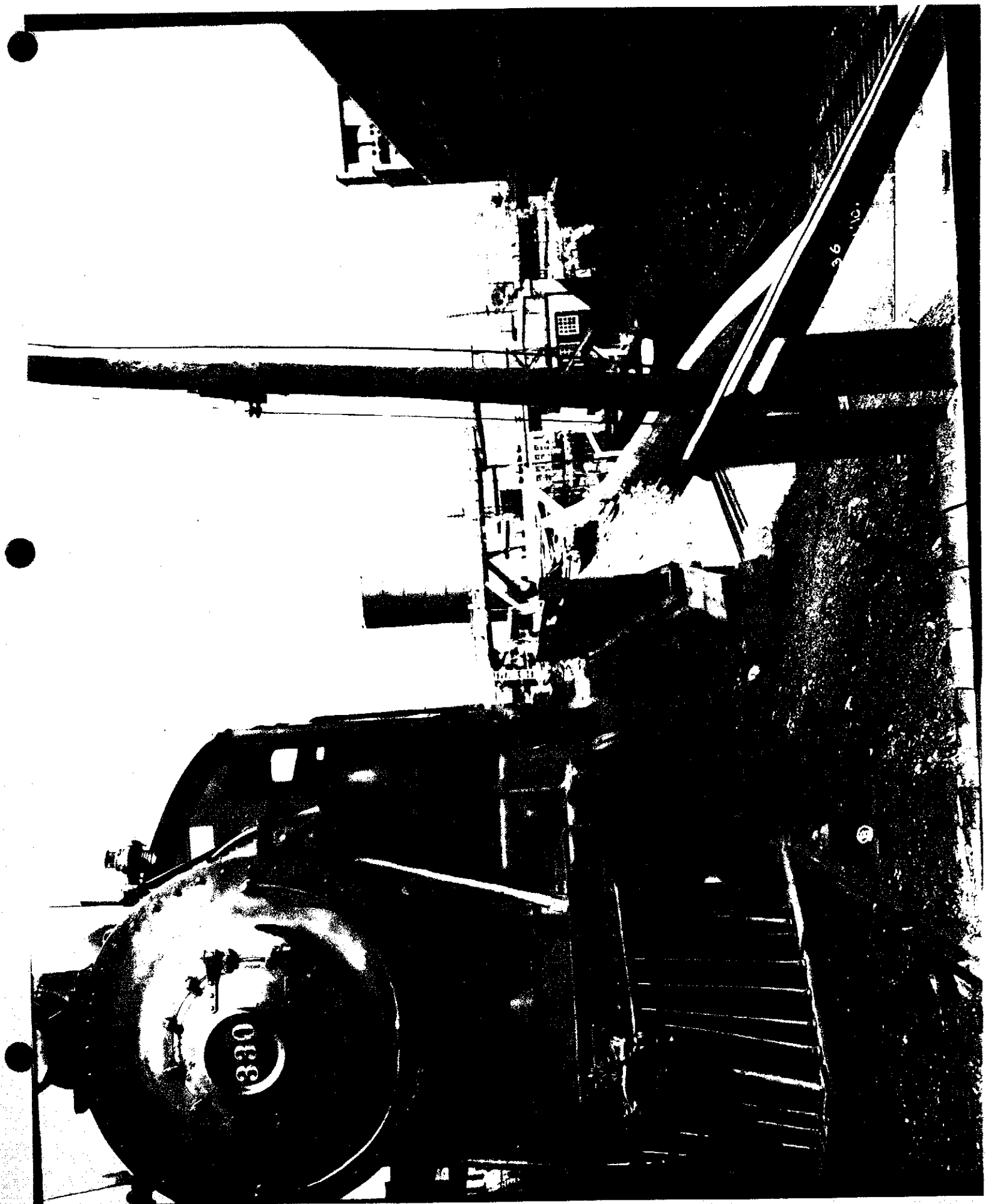




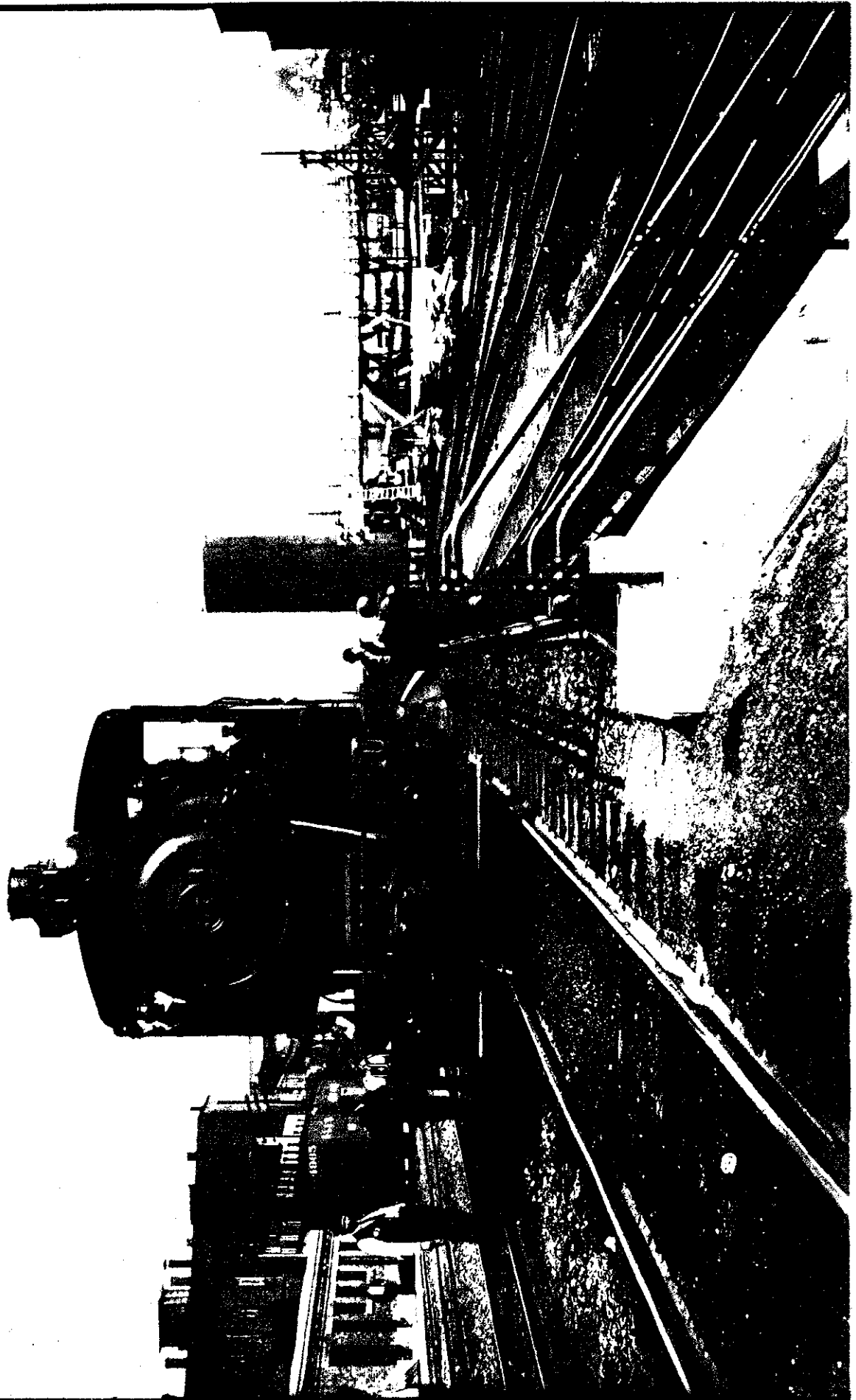


D. L. & W. GAS HOUSE
- BLOWERS -
PHOTO # B. 685.
S. 25 '16

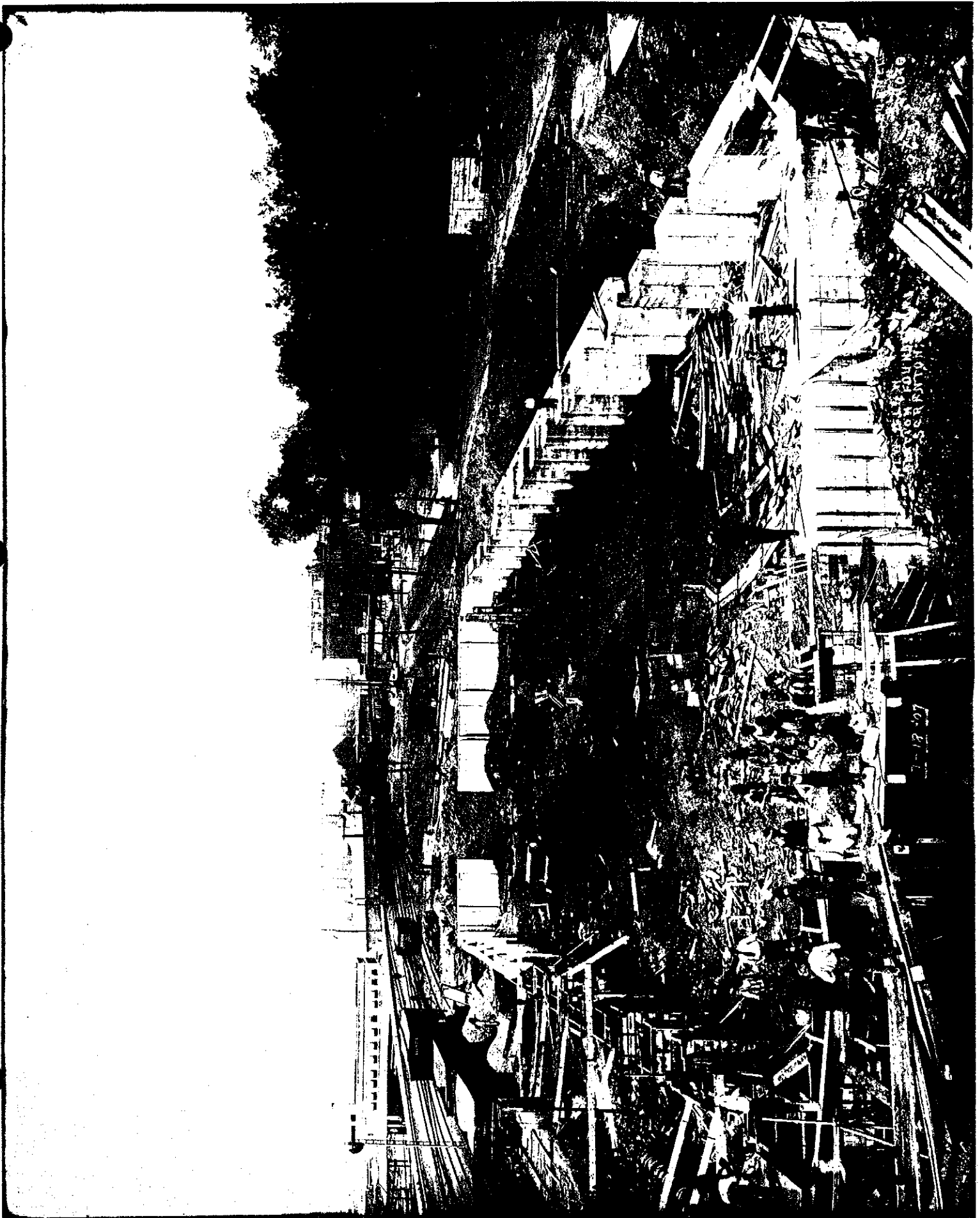


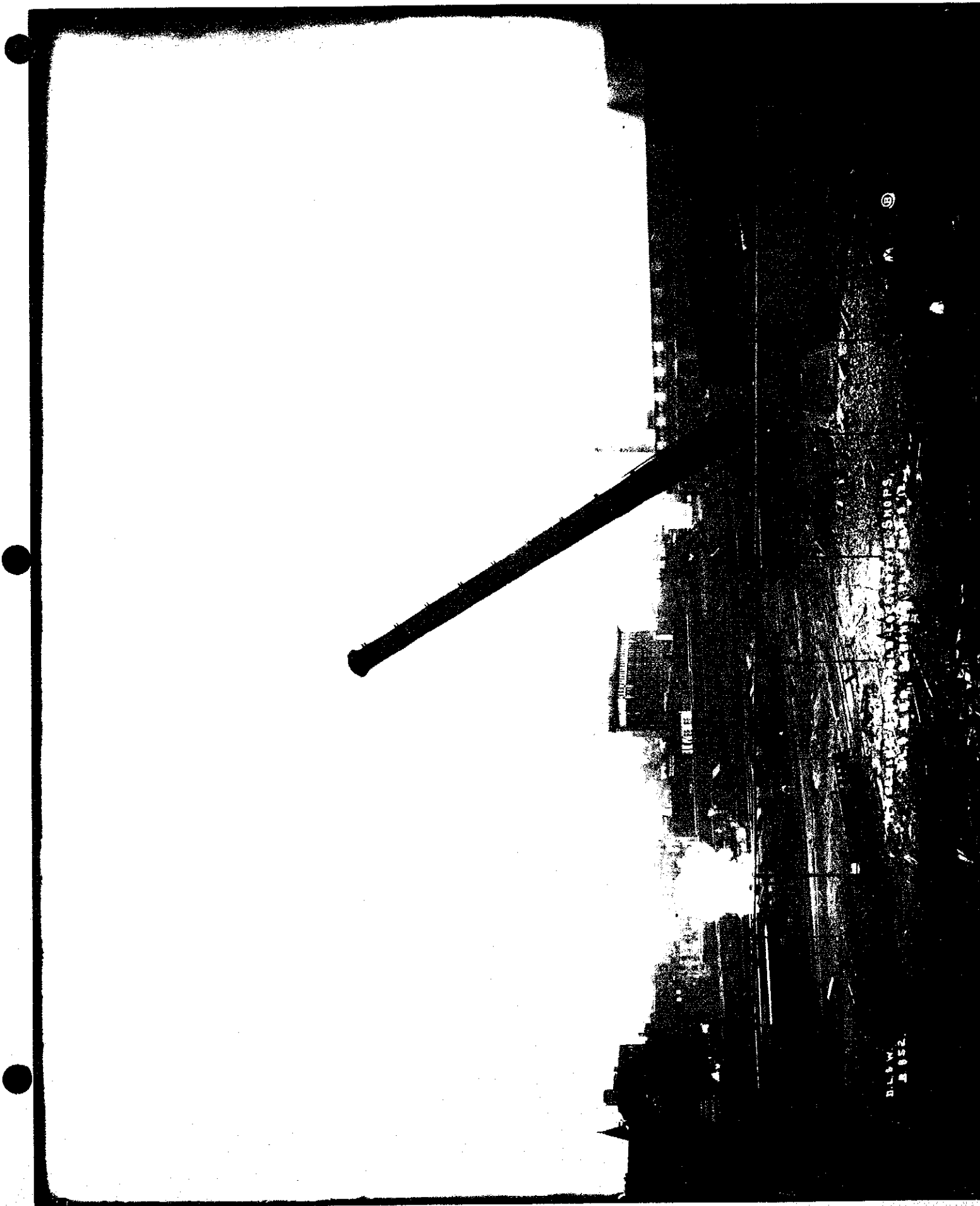


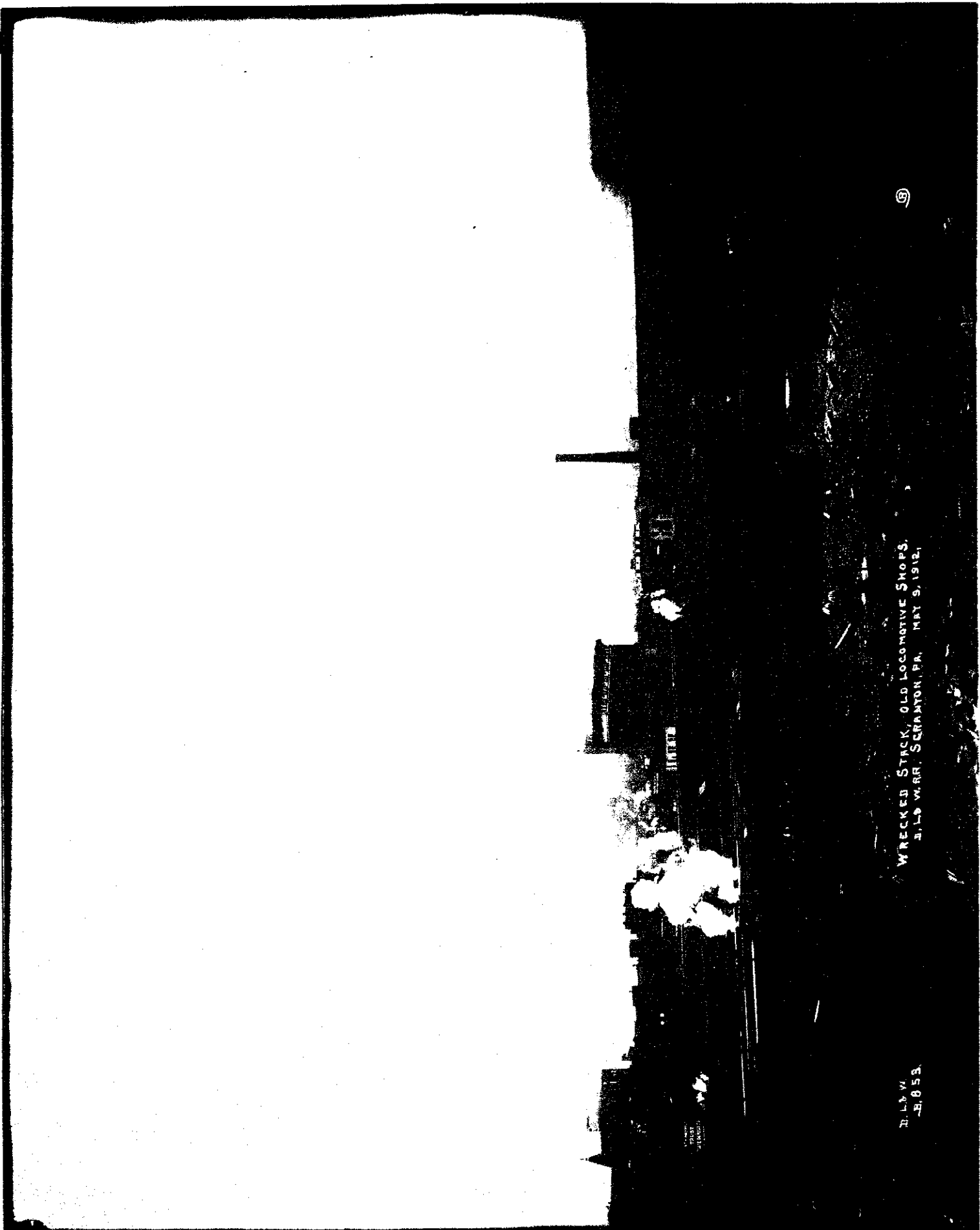












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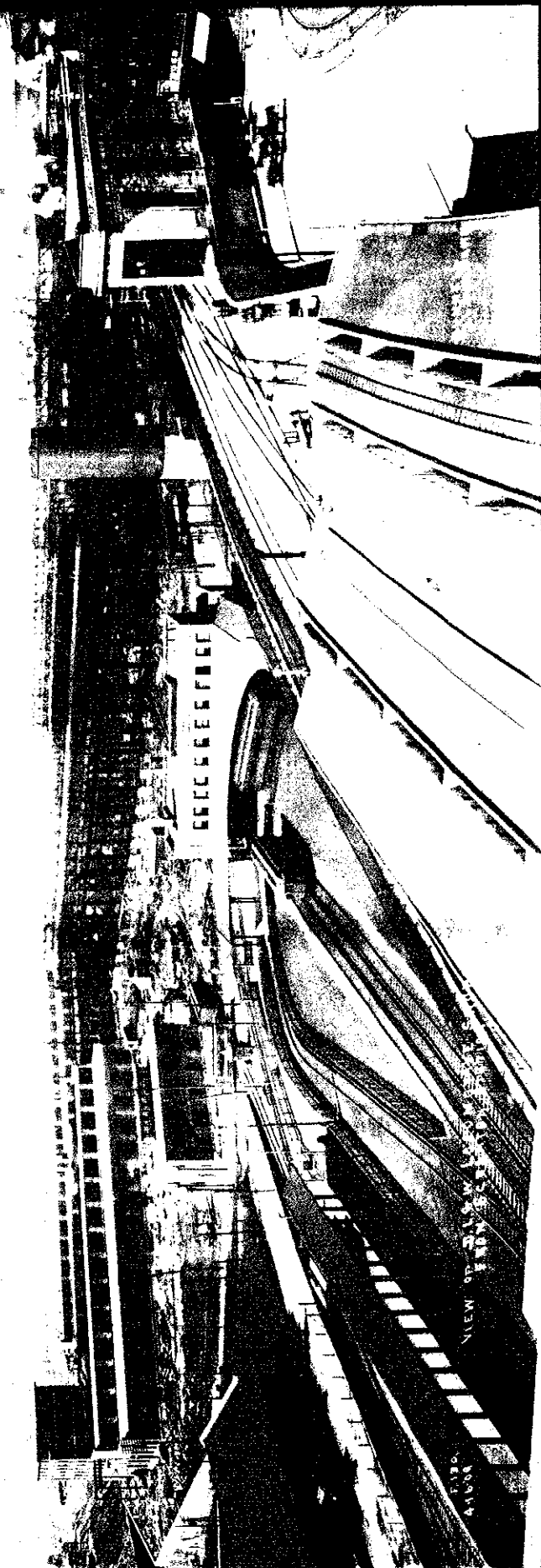
WRECKED STACK, OLD LOCOMOTIVE SHOPS,
J.L.B. WARR, SCRANTON, PA. MAY 9, 1912.

J.L.B. W.
-B. 853.

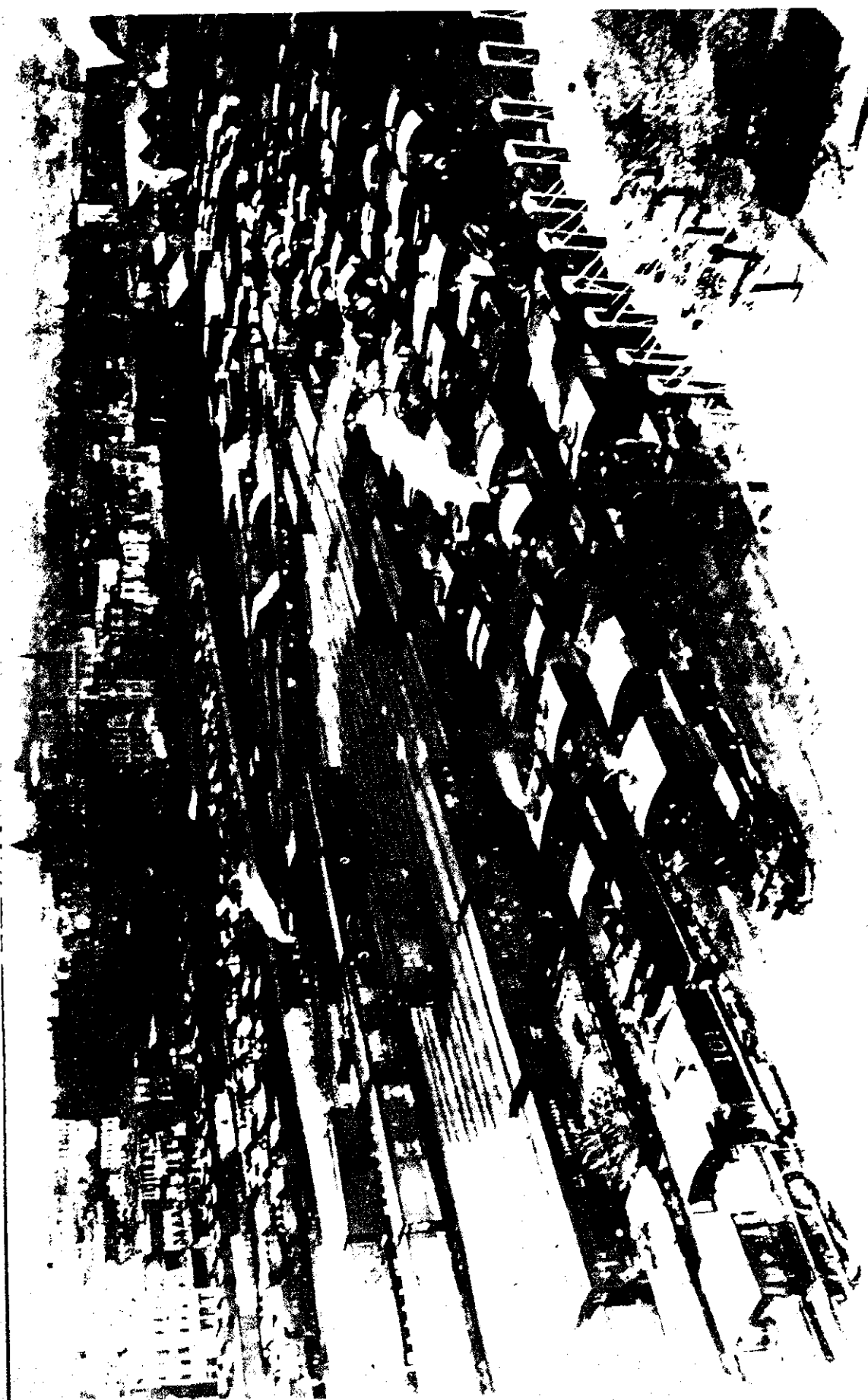


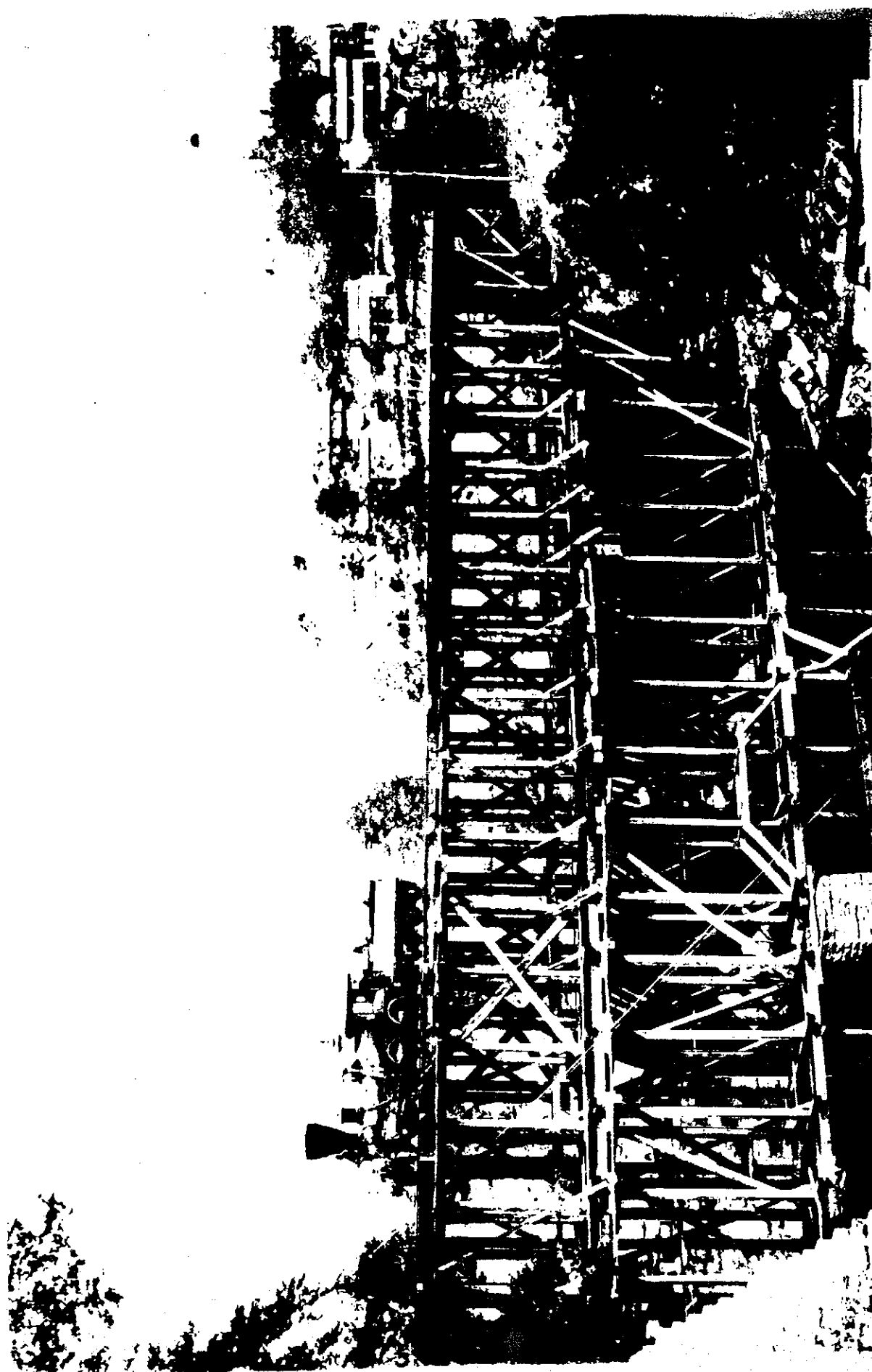
WRECKED STACK, OLD LOCOMOTIVE SHOPS,
B. & O. R.R., SCRANTON, PA., MAR. 9, 1912.

B.L.W.
B. 134.









TRESTLE OVER LACKAWANNA RIVER AND AREA UNDER CONSTRUCTION
View looking West from Lackawanna Avenue
Taken Sept 1914

